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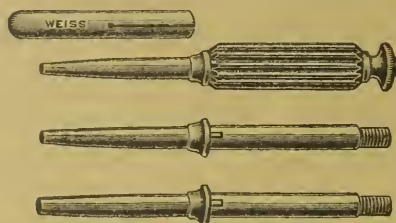
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CONTENTS.

Original Communications.—

	PAGE
1. Hanford McKee, B.A., M.D.—A Study of the Pathological Histology of Trachoma: the Trachoma Bodies	2
2. H. M. Traquair, M.D.—Notes on the Bacteriology of a case of Purulent Keratitis	6
3. James Bordley, Junior, M.D.—The Early Recognition of Choked Disc	9

Clinical Memoranda.—

1. F. W. Edridge-Green, M.D., F.R.C.S.—The Effect of the Colour of the Blood in the Blood-vessels of the Retina seen subjectively	17
2. Ernest Thomson, M.D.—Experience with Buchanan's Corneal Microscope	17

Novelties.—

Iontophoresis in Eye Work	18
----------------------------------	----

Translation.—

Indications and Comparative Value of Perforating Sclerectomy (a) without iridectomy; (b) with peripheral iridectomy; and (c) with ordinary iridectomy. By Professor Felix Lagrange	22
--	----

Current Literature.—

I. Visual Phenomena connected with the Yellow Spot	38
II. Telescopic Spectacles	41
III. Bacteriology	46
IV. Cytological Examination of the Conjunctival Secretions	48
V. The Ætiology of Trachoma	52
VI. Tumours of the Lacrymal Gland	54
VII. Tumours of the Eyelid	55
VIII. Tumours of the Extrinsic Muscles of the Eyeball	56
IX. Tumours of the Iris	57
X. Injuries by Anilin Pencils	60
XI. Detachment of the Retina	61
XII. Mooren's Ulcer of the Cornea	62
XIII. Conical Cornea... ..	63
XIV. The Fundus Changes in Chronic Cyanotic Polycythæmia	65
XV. The Jequirity Treatment of Epithelioma	55
XVI. Serum and Vaccine Therapy in Diseases of the Eye... ..	67
Book Notices	74
Correspondence	82
Notes and Echoes	83

ORIGINAL COMMUNICATIONS.

A STUDY OF THE PATHOLOGICAL HISTOLOGY OF TRACHOMA:

THE TRACHOMA BODIES.*

BY

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(From the Pathological Laboratory of the Montreal General Hospital.)

I. The Trachoma Follicle.

THE present study of the pathological histology of trachoma consisted in the examination of tissue taken from twenty-five adult patients, all of whom had clinically active trachoma. No material was taken either from children, infants, or from old cases with scar formation. In six of the cases studied the trachoma bodies of Halberstaedter and Prowazak were found in the smear preparations from the conjunctiva. The tissue was fixed in Zenker's solution, alcohol, and formalin, washed in water, hardened in alcohol, embedded in paraffin, and stained with eosin-methylene-blue and phosphotungstic acid-haematoxylin.

The anatomical changes in granular ophthalmia, or trachoma, consist in (1) papillary hypertrophy of the conjunctiva of the lids, (2) the development in the conjunctiva of granulations which, in the retrotarsal fold, are characteristic.

The pathological histology naturally centres about the granulomatous or hypertrophied lymphoid follicles which, though they may vary in character, are always present. The most valuable features in examining the tissue were these large and small masses. Sometimes they were so numerous and large that they fused with neighbouring ones, making the section one dense mosaic of cells. They occurred beneath the epithelium in the adenoid layer of the conjunctiva, and pushing up the epithelium, caused folds and furrows. The density of the epithelium varied. It was usually thickened but was seen at times to be thinned. Necrosis was present here and there and polymorphonuclear infiltration was common. The epithelial layer was also found infiltrated with lymphoid and plasma cells.

In the tissue surrounding the follicles the changes were more uniform. The subepithelial blood vessels were injected and the subepithelial tissue was thickened and dense. Eosinophiles were frequently seen. Here was found widespread infiltration with lymphoid and plasma cells. The latter, while not occurring in the follicle proper, were found in large numbers in the neighbouring infiltrations. Mast cells were not uncommon.

The subepithelial inflammation was of the subacute type. At the periphery of the follicle two or three rows of smaller cells, closely packed together, were more deeply stained than the cells of the centre. They were lymphocytes. The bulk of the cells in the follicles were large lymphocytes with round pale nuclei identical in appearance with those in the germinal centres of lymphoid follicles elsewhere in the body. Many of these cells were in mitosis. The

*Read before the American Association of Pathologists and Bacteriologists, Washington, May, 1910.

follicles had a definite reticulum and blood supply. The reticulum was well seen in slides stained with phosphotungstic-acid-haematoxylin. At the periphery the tissue contained fixed connective tissue cells with pale nuclei.

There were also large mononuclear phagocytic cells with irregular cell bodies which had numerous processes. The round or oval nucleus was large and pale. They contained numerous cell inclusions. From their relation to the delicate strands of fibrous tissue, we believed them endothelial cells of the reticulum. In the epithelial cells in sections from cases where trachoma bodies were found, clusters of granules which stained red were seen. These were close to the nuclei of the cells, and were surrounded by blue stained material which was denser than the surrounding protoplasm. It is probable these were the bodies seen in the smear preparations, the difference in the staining reaction being accounted for by the eosin-methylene-blue stains. In other slides, similar red granules, surrounded by vacuoles, were found within the nuclei of the epithelial cells. They were seen here in great numbers.

The lymphoid follicle in trachoma, then, differs from collections of lymphoid cells in chronic inflammatory conditions in that—(i) it is composed of large cells, with vesicular nuclei, identical with those in the germinal centres of lymph nodes; (ii) many of these cells are in mitosis; (iii) the lymphoid follicle of trachoma has a definite reticulum; and (iv) capillaries are present.

II. The Trachoma Bodies.

The second part of our work was taken up with a study of the cell inclusions first described by Halberstaedter and Prowazek, especially with regard to their specificity.

In 1907 Halberstaedter and Prowazek reported having observed in the epithelial cells of the conjunctiva in cases of trachoma, inclusions which they believed were parasites and probably the cause of trachoma. After staining the smear preparations with Giemsa, they found near the nucleus of the epithelial cells, round or oval, dark-blue or violet, non-homogeneous masses. Within these bodies, with good staining, they found very sharply defined small bodies, which stained a red colour. There were also found within the cells blue stained masses which they believed were the result of the reaction of the cell to the invasion of the virus. These they called plastin clots. The small red-stained bodies they believed were micro-organisms for the following reasons:—

(1) In the microscopical preparations they were always seen with the same characteristic appearance.

(2) Having transferred them to the conjunctiva of the orang-outang they were then found in the conjunctival epithelium of the latter in great numbers, and, further, inoculation from orang-outangs to orang-outangs was possible. Although the cardinal sign of trachoma did not appear (the formation of follicles), Halberstaedter and Prowazek presumed contagiousness because similar bodies were found in the conjunctiva of the orang-outang.

According to their view, the virus belongs to the same class as the exciters present in smallpox and scarlet fever. They live intra-cellularly and the cells react on their invasion by the formation of peculiar specific inclusions which are partly chromatic and partly of nuclear nature. They propose for them the name "Chlamydozoa." Halberstaedter and Prowazek's findings have been corroborated from various sources.

Fuchs, from the work of his assistant, who has found these bodies in large numbers of fresh and old cases of trachoma, believes their presence of value from a diagnostic point of view. Others, as Addario, believed them artefacts

composed of sedimented staining matter, mixed with degenerated cells in the course of preparation. Lodato, who claimed to have never seen them in spring catarrh, was of similar opinion; but as Clausen at the last International Congress stated, Addario and Lodato had not submitted any microscopical proof in support of their contentions. The bodies which they described were not identical with trachoma bodies, had been seen by him in various forms of conjunctivitis, and after some practice, could be readily distinguished from Prowazek bodies.

Heyman, of Breslau, examined a series of cases to see if these bodies were peculiar to trachoma, and so of value in diagnosis. Of nine cases in which he found the trachoma bodies, five were instances of active trachoma, and four of gonorrhœal ophthalmia. In all these four cases the gonorrhœal nature of the infection was established from the history, clinical appearance, and bacteriological examination, while the possibility of trachomatous infection was carefully excluded. In all the characteristic cap-like forms were found in large numbers. This was especially true in three of the cases which were untreated ophthalmia neonatorum. Such authorities as Pfeiffer and Uhthoff were unable to distinguish between the bodies seen in these cases and those found in trachoma. Hence, Heyman concludes it is possible to declare the Prowazek bodies as specific for trachoma, so long as there is lacking proof of the variability of the bodies found in ophthalmia, and in trachoma, and, further, that the Prowazek bodies are of value in diagnosis only when every suspicion of gonorrhœa has been removed.

Heyman's report naturally caused considerable stir, and workers in this subject proceeded to verify his report by examining cases of ophthalmia. Among eighty-two cases Flemming found the trachoma bodies in nine. He differentiates four types of the bodies, but does not consider these developmental stages. Halberstaedter found the bodies in non-gonorrhœal blennorrhœas but they were absent from a number of genuine gonorrhœal infections. He also found the trachoma bodies in the genital tract of the mothers.

Wolfrum is unwilling to accept Heyman's facts. He examined twenty cases of gonorrhœal ophthalmia and in no case was he able to find cell inclusions corresponding to those of trachoma. He believes Heyman's findings were from mixed cases of trachoma and gonorrhœa, because, among eight cases of what he calls "catarrhal conjunctivitis," he found the trachoma bodies in four. In one of these cases, a seven days' old child, in which numerous bodies were found, the conjunctiva of the lower lid was uneven and slightly granular. Examination of the tissue failed to show the typical follicle formation, and very properly so in a seven days' old child. Some of the conjunctival secretion from this case was inoculated into an adult's conjunctival sac, which he had found free from trachoma bodies. One week later, follicles were found in the lower retro-tarsal fold, and after nine days, the trachoma bodies, in large numbers. The further course of the infection was that of genuine trachoma. From this he concludes that Heyman's findings were from mixed infections.

III. Methods and Results.

The mode of examination was as follows.—An ordinary ear curette was used to scrape the conjunctival surface gently without causing it to bleed. The material obtained was then smeared over a glass slide, allowed to dry in the air, and then fixed in 80 per cent. alcohol for fifteen or twenty minutes. The slide was stained with one drop of Giemsa solution, to which twenty drops of distilled water were added, for one hour. It was then washed, dried in the air, and examined in the usual way.

By this method the cytoplasm of the epithelial cells is left clear or a very faint pink. The nuclei of the cells are a definite pink or red colour; the nucleoli are more deeply stained than the nuclei. When present, the trachoma bodies are seen as a mass of dots stained a deep-blue. Only close examination will show the blue-stained mass separated into tiny dots, which look not unlike tiny diplococci. In the centre of these masses one may find some dots which have taken a red stain.

The bodies, as a rule, are closely related to the nucleus, covering it like a cap, but one may also be found some distance away from it. They also vary in size from the single dots to groups occupying the whole cytoplasm of the cell.

(i) Do the trachoma bodies of Halberstaedter and Prowazek occur in all cases of active trachoma?

(ii) Do they occur in old quiescent trachoma?

(iii) Are they present in other mucous membranes?

(iv) Do they occur in other forms of conjunctival inflammation or in the normal conjunctiva?

(i) In twelve cases of clinically active trachoma we found the trachoma bodies present in eleven. In one case examined before we had seen any of bodies, and while the *technique* was being learned, the result was negative. In two cases where the clinical appearance was identical with active trachoma, but where diplo-bacilli were present in large numbers, no bodies were found. The quick reaction to treatment showed these cases were not trachoma. This experience corresponds very probably to that of others, so that we should bear in mind all granular conditions of the conjunctiva, even those clinically similar to trachoma, are not trachoma. In other words, the diplo-bacillus of Morax-Axenfeld is able to set up a condition which can only be differentiated from trachoma by bacteriological methods.

(ii) With regard to the presence of trachoma bodies in cases of old trachoma, our experience does not coincide with that of those who have found the bodies under these circumstances. In six cases with scar formation with pannus, the examination was negative.

(iii) In ten preparations from normal and inflamed tonsils no bodies were found, but in one case inclusions, somewhat similar in position and staining reaction, were seen. In five examinations of the vaginal mucous membrane the result was negative.

(iv) In a series of sixty-six cases of other forms of conjunctivitis, mostly Morax-Axenfeld, no inclusions similar to the trachoma bodies were found. In one case of an adult male with an inflamed conjunctiva, due to a foreign body in the cornea, but where there was not the slightest sign of trachoma, inclusions were found which could not be differentiated from the Prowazek bodies.

Three infants with normal conjunctivæ, all less than three weeks old, were examined: trachoma bodies were found in two. The epithelial cells contained inclusions which in position and staining reaction, were identical with the inclusions described as characteristic of trachoma. This was not an isolated finding, nor was there any question about the bodies. A number of cells were seen with the inclusions covering the nuclei like a cap, in others with the bodies away from the nuclei. The red granules were seen much better in the bodies from the non-trachomatous eye than in some of those from the trachoma cases.

IV. Conclusions.

1. The trachoma bodies of Halberstaedter and Prowazek are constant in acute trachoma.

2. That the inclusions are protozoa and the cause of trachoma we do not believe proved, but as yet we are unable to offer any suggestion as to the nature of these inclusions.
3. The trachoma bodies are not specific for trachoma.
4. They occur in other conjunctival inflammations and in the normal conjunctiva. To what extent they are present in non-trachomatous eyes is only now being worked out.
5. The aetiology of trachoma is still undiscovered.*

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NOTES ON THE BACTERIOLOGY OF A CASE OF PURULENT KERATITIS.

BY

H. M. TRAQUAIR, M.D.

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J B., a miner 58 years old, received a blow on his right cornea from a chip of stone. After two days the eye became painful, and on the fifth day the patient presented himself at Dr. W. G. Sym's clinic in the Edinburgh Royal Infirmary.

The eyelids were reddened and oedematous, the conjunctiva was swollen and congested, the bulbar portion being intensely chemosed so that it overlapped the corneal margin all round. The upper and inner quadrant of the cornea was occupied by an oval yellow area of dense sloughy tissue, 6 mm. high by 4 mm. across, touching the limbus at its upper-inner margin. At the upper and inner part of this area there was a small hole, less than a millimetre in diameter, which opened into a space enclosed between the slough in front and the corneal tissue behind. The remainder of the cornea was clear, with the exception of a small, greyish, deep infiltration at the outer side of the sloughy area near the limbus. The pupil was moderately dilated, as the patient had been using atropin for two days.

By pressing down the chemosed conjunctiva a hypopyon of about 2 mm. could be brought into view. There was no dacryocystitis, and no history of watering of the eye.

The ulcer was treated by zinc iontophoresis and for three days did well, and the slough disappeared excepting from the upper-outer part of the cornea. On the fourth day the process seemed to be spreading at this spot, and another application was made. Extension seemed now to be checked, but suddenly during the night of the sixth day, the condition became greatly aggravated. The infection spread deeply into the cornea, especially at the upper and outer part and a portion of the floor of the ulcer necrosed, and perforation occurred. A third application of zinc was made. Healing now set in, and on the thirtieth day the eye was well with a moderately dense but extensive scar and a good anterior chamber. Subsequently, V. = fingers at $\frac{1}{2}$ meter was obtained after iridectomy.

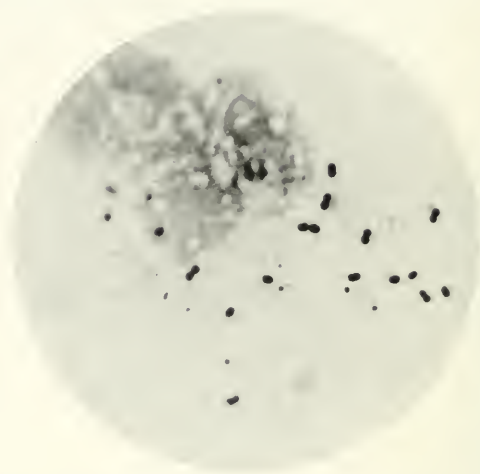
* I am greatly indebted to Dr. S. B. Wolbach, the director of the laboratory, for his supervision and assistance in this work.

NOTES ON THE
BACTERIOLOGY OF A CASE OF PURULENT KERATITIS.

BY
H. M. TRAQUAIR, M.D.



1.—Pus from ulcer. Gram. $\times 1000$. Chain of average length.



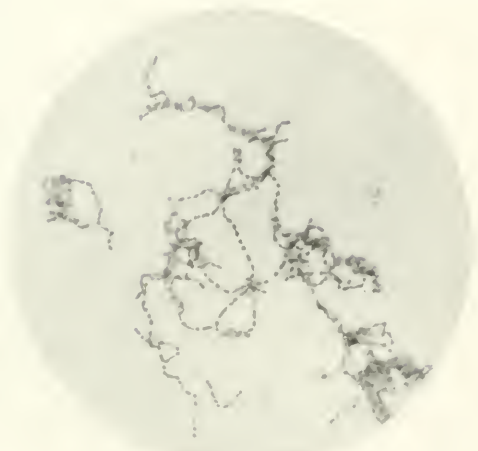
2.—Pus from ulcer. Gram. $\times 1000$.



3.—A. From culture. Showing appearance of chains. Thionin blue. $\times 1000$.



4.—B. Cultivated under same conditions as No. 3. Th. blue. $\times 1000$



5.—C. Cultivated under same conditions as 3 & 4. Th. blue. $\times 1000$.



6.—A. Mouse blood. Th. blue. $\times 1000$
Showing large capsules.

Cultures and films were made from material obtained by passing a platinum wire into the small hole in the slough. All the organisms seen were Gram-positive. They were :—

(1) Diplococci, mostly rounded or flattened, very few elongated forms. No typical lancet-formed diplococci were seen. Also many single round cocci. Here and there an appearance resembling a capsule was seen, but this was exceptional.

(2) Chains of cocci, often in pairs, often flattened. Many were round, and a very few elongated. Chains of four to six or eight were very common, chains of about twelve members were frequent, and others of twenty to forty members were present in smaller numbers. For the most part, the single cocci and diplococci were found in groups together, the longer chains usually lying more or less isolated in the field.

(3.) A few isolated groups of bacilli resembling diphtheroids.

No growth was obtained on glycerine agar, but a broad, moist, slimy streak formed on Loeffler's blood serum. Plates were made from this on ovarian serum agar, and three varieties of cocci were isolated which, for convenience, may be named A, B, and C. These were now plated out on ovarian serum agar and thence inoculated on to ascites agar, glycerine agar, Loeffler's blood serum, blood agar, peptone broth, neutral red agar, glucose agar, gelatine, and potato.

No growth was obtained in any case on any of the last four media and vigorous growths were obtained only on media fortified by the addition of ovarian serum or similar material. Reinoculation every two or three days was necessary to keep surface colonies alive; the organisms lived much longer in the fluid at the bottom of a serum agar tube. Without going into wearisome detail, the chief cultural features were as follows :—

A produced constantly on ovarian serum agar the large, flat, slimy colonies characteristic of the *streptococcus mucosus*, and on blood agar a broad slimy streak of a dirty grey-brown colour without hæmolysis. The growth in glucose agar described by Richardson¹ as characteristic was not obtained.

Microscopically, A appeared as a Gram-positive diplococcus composed of rounded or slightly elongated individuals. Short chains only, of four to twelve members, were found, especially in the fluid of serum agar tubes. In older cultures club-like degeneration forms were common. Attempts at capsule staining proved negative.

B and C constantly formed minute whitish colonies resembling those of streptococci. Excepting for slight but definite differences in the appearance of the colonies, both naked eye and microscopic, they were practically indistinguishable. On blood agar decided hæmolysis was produced in 24 hours.

Morphologically, B and C were similar, appearing as small Gram-positive cocci, about half the size of A, forming chains and aggregated masses. The masses were composed of cocci varying in shape and size and showed chain formation at their edges. They closely resembled those described by Seitz¹ as "*streptococcus aggregatus*." The chains were mostly long, but varied from a few members up to over a hundred. Capsule staining was negative.

Tested by Gordon's² fermentation tests A, B, and C gave almost identical reactions, which were, however, typical neither of pneumococci nor of streptococci but showed features indicating an intermediate form, inclining, if at all, towards the pneumococcal type. All fermented inulin and none salicin.

Dr. Shennan kindly inoculated three mice intraperitoneally with pure cultures. The mice died, A in 24, B in 36, and C in 48 hours. In A a very abundant, thick, mucoid, grey, sticky, semi-transparent exudate was formed, that in B and C being similar but not nearly so abundant. Examination of films from the peritoneal exudate and blood showed in A diplococci and chains of four to

six members, characterised by very large capsules, which stained readily with thionin blue. B showed rounded and elongated diplococci, and C rounded diplococci. B and C showed chains of up to 8 members and no capsules.

Cultures now made from the peritoneal exudate of the mice all gave colonies similar to A, no hæmolysis was produced by B or C, and all differences seemed to have disappeared.

For six weeks A, B, and C had bred true, and cultures were now made from the fluid at the bottom of ovarian serum agar tubes which had remained untouched in the incubator for a fortnight. Here again, only large flat colonies were produced, and A, B, and C appeared to have lost their distinctive characters, although there was still a tendency in B and C to form masses and longer chains. B and C no longer produced hæmolysis. Thus keeping in the incubator, and passage through a mouse, were followed by the same result.

All three were dissolved by a 5 per cent. solution of sodium taurocholate which left a control streptococcus undissolved, and this control also grew quite well in broth in which A, B, and C had been grown. The results of these tests, which unfortunately were not used while the distinctive characteristics of A, B, and C were present, show that the cocci may be considered to belong to the pneumococcal rather than to the streptococcal type.

Buerger³ describes a form of pneumococcus whose colonies are indistinguishable from those of the streptococcus mucosus. The large capsules and large cocci and the growth on blood agar are however strong evidence in favour of the organism A in this case being a genuine streptococcus mucosus. The absence of the growths in glucose agar stab cultures and in gelatin, which Richardson⁴ considers characteristic, may have been due to differences in the composition of the media.

The two more definitely streptococcal varieties B and C, may be regarded as intermediate forms between the pneumococcus and the streptococcus pyogenes. Similar alterations in growth to those observed have been described by Norris and Pappenheimer⁵, Schereschewsky⁶, and many others, and considerable diversity of opinion exists as to the constancy of the reactions in various media.

Since Kruse and Pansini⁷ in 1892 first thoroughly investigated the diplococcus pneumoniae and its relations, a very large number of observations on these points has accumulated. This is not the place to discuss the general question of the relation between pneumococci and streptococci and intermediate forms; the literature will be found in papers by Buerger³, Arzt⁸, Koch⁹, and others. Of greater interest to the clinician is the connection between the bacteriology and the character and course of the ulcer.

Bacteriological diagnosis from a smear preparation as between pneumococci and streptococci is discussed by Uhthoff^{10,11} and Axenfeld¹⁰ who considered that it rarely presented any difficulty. Axenfeld¹² states that the pneumococcus never forms chains of more than two or three members in secretion, and in hundreds of cases of *ulcus serpens* he has never found both organisms together; it may, however, be difficult to distinguish between streptococcus mucosus and pneumococcus. Elschnig and Ulbrich¹³ however, find differential diagnosis so difficult that they prefer not to make a definite separation between pneumococci and streptococci, but to class them together as streptococci.

Excluding cases of keratomalacia in feeble patients, reports of streptococcal corneal ulcers are rare. Two described by Hertel¹⁴ were characterised by deep extension and rapid perforation. On the other hand, Uhthoff¹⁵ supports the view that atypical suppurative keratitis due to streptococci may present no special clinical picture.

In this case, while definitely chain-forming cocci were present in the ulcer,

associated with deep extension and early perforation, cultivation showed them to be not of the streptococcus pyogenes type, a fact which may possibly account for the relatively favourable termination, as the prognosis of streptococcal ulcers is usually bad.

Infection of the eye by the streptococcus mucosus has been seldom observed as yet. It has been found in cases of panophthalmitis by Pagenstecher¹⁶ and Arzt¹, and in conjunctivitis by Wirtz¹⁷ and Rupprecht¹⁸, but not hitherto in purulent keratitis.

My thanks are due to Dr. W. G. Sym for permission to publish this case, and to Dr. Shennan for kindly making the inoculations.

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THE EARLY RECOGNITION OF CHOKED DISC.*

BY

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I AM confident that a careful review of the literature will bear me out in the statement that choked disc, headache excepted, is the most common symptom in tumour of the brain. Leslie Paton¹ in his analysis of the clinical

* Communication read at the Fifteenth Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology, Cincinnati, Ohio, September, 1910.

records of 200 brain tumours, found that choked disc was present in 80 per cent. of the cases. de Schweinitz² found "optic neuritis" in fully 85 per cent. of the cases examined by him. The figures of Edmunds and Lawford,³ Martin,⁴ Bramwell,⁵ Kampherstein⁶ and Oppenheim,⁷ are but slightly less, while those of Annuske and Reich reach 95 per cent.⁸ Through the courtesy of Dr. Cushing, I have had ample opportunity of verifying the accuracy of their statements. Indeed, my own experience leads me to subscribe to the statement of Gowers⁹ that "the value of optic neuritis as an indication of intra-cranial tumour is very great . . . in at least four-fifths of the cases of tumour, it may be the only unequivocal sign of the organic intra-cranial disease."

Sir Victor Horsley¹⁰ urges the importance of studying the papilla in cases of suspected tumour, not only as a means of diagnosis but also for its value in determining the side on which the tumour lies. In a communication of recent date published by Dr. Cushing and me, we expressed the view that in spite of the fact that in 70 per cent. of the patients studied by us, the greatest change in the optic nerve was on the side homolateral to the tumour, we were firmly of the opinion that the ophthalmoscopic findings are misleading, and that the great number of instances where the tumour is on the contralateral side casts a doubt on the value of choked disc as a means of localization.¹¹ In this view I find substantial support in the statements of de Schweinitz¹² and Paton.¹³

Nor am I prepared to believe that a choked disk, by its height, can be of assistance to the surgeon in determining either the nature of the growth or its exact position. If a tumour could with any degree of accuracy be located and its nature determined by pathological alteration in the optic papilla, it would be of inestimable value; granting, however, that this is impossible, choked disc still is of sufficient importance when we realize the truth of Gowers' statement, that "it indicates progress in the morbid growth and its consequences."¹⁴

Simple Hyperæmia.

To recognize choked disc when fully established is an easy matter, but in its early stages it often presents complex and confusing problems. We are told that hyperæmia, when of benign origin, should not be mistaken for incipient choked disc, for the latter is, in reality, not simple hyperæmia, but congestion with œdema. Associated with the hyperæmia of choked disc there is undoubtedly œdema, and if it could with readiness be distinguished there would be little difficulty in establishing a diagnosis. This is, however, so far from being the case, that I venture to say that many cases are presented for examination in which the most skilled ophthalmologist would not risk an opinion. Nevertheless, there are certain changes which, when found, strongly suggest the presence of œdema. Chief among them is dilatation of the very minute vessels which lie between the nerve bundles; by the increase in their size they are thrown into stronger relief, and where the nerve fibres are most numerous the difference in colour between the swollen vessels and cloudy tissue results in an appearance of striping. This is particularly well seen along the superior and inferior nerve margins. While there is not infrequently striping of the edges of a normal disc, the picture is not exactly that of incipient choked disc, the chief difference lying in the absence of vascular distension.

Next in importance in determining the presence of œdema is the actual elevation of the disc. As Gowers has pointed out, the papilla derives its name from the fact that it lies in a plane anterior to that of the surface of the retina.

We are, therefore, handicapped in determining the slight elevation of the primary stage of choking. Study of the physiological cup, as an aid in deciding this important fact, is invaluable. Normally, the more compact the nerve fibres, the greater will be the elevation of the disc and the wider will be the physiological cup. Add, however, œdema, and there is an increase in the height of the disc and a diminution in the width of the cup. The inference to be drawn, therefore, is that a slightly elevated disc with a wide cup is suggestive of nothing abnormal, while an elevated disc with a narrow cup should be looked upon with suspicion.

Again, the greater the height of a normal disc the deeper the physiological cup. In the initial stage of choked disc, coincident with the elevation of the disc, the cup becomes more shallow. This results from swelling both of the sides of the excavation and the lamina cribrosa.

Under normal conditions, the nasal edge of the cup is more or less angular, and the temporal edge only slightly elevated. One of the first signs of œdema is the rounding off of the nasal and an increase in the height of the temporal margin of the cup. Other changes than those in the papilla occur during the first stage of choked disc. I refer particularly to the retinal vessels. In exaggerated simple hyperæmia the arteries and veins, as a rule, appear distended and slightly tortuous. The tortuosity is shown by long curves which lie flat on the retinal surface. In contra-distinction to this, in incipient choked disc, the arteries are usually of normal size and but slightly, if at all, tortuous; the veins are rather large and often show numerous abrupt curves. If the increase in intra-cranial tension is rapid, the arteries frequently appear constricted, the veins markedly dilated and extremely tortuous, the curves lying on a plane at right angles to the surface of the retina. If the later stages of choked disc are slow in making their appearance, the retinal vessels may resume their normal condition.

Associated with the venous stasis of choked disc there is frequently a dilatation of the veins of the lids. And, if the circulation in the cavernous sinus is obstructed, the conjunctival vessels not infrequently become engorged and the conjunctiva œdematous.

The sudden appearance of an abnormal number of small veins on both the discs and in the retina is also very suggestive of œdema. If one disc is swelling and the other remains normal this difference is very striking. I have counted more than twice the number in the affected than in the unaffected eye. Indeed, in our work on increased intra-cranial tension, the sudden appearance of hitherto unobserved small veins was frequently the first sign noted.

Pseudo-papillitis.

Besides simple, but exaggerated, hyperæmia, there is another abnormality which so closely simulates choked disc as to render its study of great importance. I speak of the so-called "pseudo-papillitis" or "spurious choked disc." In this fairly rare condition the disc is elevated two or more dioptres and is hyperæmic, the physiological cup is narrowed, and the lamina cribrosa is obscured. The most essential difference between this and true choked disc is the non-progressiveness of the former. The idea that choked disc often remains unaltered for months and years holds good for the gross but not for the more minute changes.

Hyperæmia of the spurious type is usually observed on the upper and nasal portions of the disc between the margin and the physiological cup. At times it extends down the sides of the cup and involves the lamina cribrosa; at others it appears between the vessels in the retina, just beyond the upper

margin. In the cases that I have studied, the disc margins were never completely blurred, and while there was frequently a halo surrounding the disc, it was not sufficiently profound to obscure its edges. In "pseudo-papillitis," the physiological cup is narrow and deep and its angular edges cut into the central vessels so sharply that, as the result of foreshortening, they disappear from view. The retinal arteries are, as a rule, more tortuous than the veins, and the curves of both are less abrupt than in the true form. The arteries are not buried in the surface of the disc in a manner similar to that found when the disc is elevated two or more dioptries from œdema, nor does an examination of the retina reveal, beyond the tortuous vessels, anything unusual. I have patients under my care in whom this picture has remained unchanged for years, and when I say that long ago I arrived at the conclusion that it was a mere congenital anomaly, which varies neither in intensity nor position, I but voice the opinion of Landolt, Uhthoff, Schneideman¹⁵, and many other distinguished ophthalmologists.

Optic Neuritis.

von Graefe, in 1859, in a communication to the *Société de Biologie de Paris*, divided what had hitherto been looked upon as neuritis, secondary to intra-cranial disease, into "descending neuritis" and "Stauungspapille." Where the changes in the papilla were slight and those in the retina were marked, he spoke of the condition as "descending neuritis," and when the disc was elevated and there was vascular distention associated with retinal hæmorrhage he designated it "Stauungspapille." The former, he thought, was an inflammatory extension along the optic nerve dependent upon a preceding meningitis, the latter resulted from obstruction in the cavernous sinus secondary to an increase in intra-cranial tension. The cavernous sinus, once blocked, he argued, stasis in the retinal veins must follow.

As a synonym for "Stauungspapille," Clifford Allbutt introduced the term "choked disc."

von Graefe's conclusions were not seriously objected to until Sesemann¹⁷, in 1896, demonstrated that the premises upon which they were based were not consistent with anatomical facts. In the light of recent experience, we must disregard also v. Graefe's ideas of the ophthalmoscopic difference between choked disc and optic neuritis of intra-cranial origin. Indeed, he recognised his own mistake, and brought forward cases, which in a large measure, disproved his original conclusions.

Working in the service of Dr. Cushing¹⁸, I have seen many so-called typical cases of optic neuritis gradually change into choked disc: likewise, choked disc lose all its swelling and assume the outlines of the picture drawn by von Graefe of optic neuritis. Surely the essential difference upon which he based his classification (that optic neuritis is more apt to involve the retina than choked disc), can no longer be regarded seriously, for we all know that at some stage in practically every case of choked disc, the retina is the seat of œdema, of circumscribed exudates, of hæmorrhage, or of degeneration. As a disc begins to swell, the retina, as a rule, becomes œdematous, but as soon as the swelling in the nerve-head becomes established, except for the macular fan, the retina loses its œdema, and, as the disc œdema disappears, the retina again becomes clouded.

I am thoroughly convinced, from my own experience, that optic neuritis is by no means as common as supposed, and that many cases which have been so classified represent either an incipient or a declining choking.

Notwithstanding the fact that von Graefe's conclusions cannot be accepted,

as a whole, to him belongs the credit for distinguishing between neuritis and choked disc, and in this he is assuredly right, for there is a difference, which can be proven, not only ophthalmoscopically, but, with equal facility, microscopically. I refer, of course, to inflammation of the optic nerve dependent upon some local injury or disease. Ophthalmoscopically, it usually differs from choked disc in that the disc is elevated but slightly, if at all, its surface is blurred by exudative deposits, and the clearness of the nervous-vascular elements of the disc, so characteristic of choked disc, is wanting.

When the retina is involved, producing the so-called neuro-retinitis, it is usually the seat of thin, but densely cloudy, exudates. The exudates are flat, their outlines are indefinite, and they are most frequently seen in the macula or just above the disc. Peri-vascular changes, which, in choked disc, make their appearance late, in neuritis are found very early. So also is optic neuritis more apt to attack but one nerve, while choked disc, in the majority of instances, involves both.

As has Friedenwald,¹⁹ I have been impressed by the astonishingly rapid failure of vision, associated with but slight visible changes in the disc, in true neuritis. In most of the patients seen by me the visual failure was not only rapid, but where the underlying cause was not soon removed, was complete, while the ophthalmoscopic picture was, cloudiness excepted, but that of an exaggerated hyperæmia. The history of choked disc is the antithesis of this; while it not infrequently remains for months, it seldom causes serious visual disturbance without the choking becomes intense or, having run its course, it declines with atrophy. To borrow a sentence from de Schweinitz: "choked disc caused by cerebral growths is perfectly compatible with good vision."

Dyschromatopsia.

Charcot and Galezowski, the latter of whom especially investigated dyschromatopsia, regarded colour reversal as a manifestation of hysteria. To-day this opinion is almost universally conceded.

In our observations of cases of brain tumour, Dr. Cushing and I were early impressed by the frequency of colour disturbances in the visual fields. We were at the first content to ascribe them to some associated functional element; but as the numbers increased, we found that its recognition was a help in the diagnosis of intra-cranial growths. While colour reversal and interlacing undoubtedly do occur in hysteria, they are, as a symptom of brain tumour, quite constant. Their recognition is therefore important.

We have but recently published the results of our observations, still I cannot, when discussing the early recognition of choked disc, dismiss the subject without, at least, briefly calling attention to such important confirmatory evidence.

The predominant feature in most of our charts is the alteration in the lines which represent blue. While the fields, both for form and colours are, in some instances, concentrically contracted, almost invariably the greatest loss is in the blue field. At times this results in interlacing of the lines for red and blue (Fig. 1); at others, the blue is found inside the red (Fig. 2); and still less frequently it is entirely lost. The usual manner in which the change in the blue field was brought about was by the formation and fusing of peripheral scotomata. Changes in the field for colours other than blue were occasionally seen, but their inconstancy, we believe, makes them of little diagnostic value. It is interesting to note that disturbance in colour-vision often foretold the changes which were later to take place in the field for form.

As an illustration: hemiachromatopsia in several instances preceded complete homonymous hemianopsia (Fig. 3).

The colour disturbances do not seem to be dependent upon the presence of neuro-retinal œdema, because in several of our patients they ante-dated

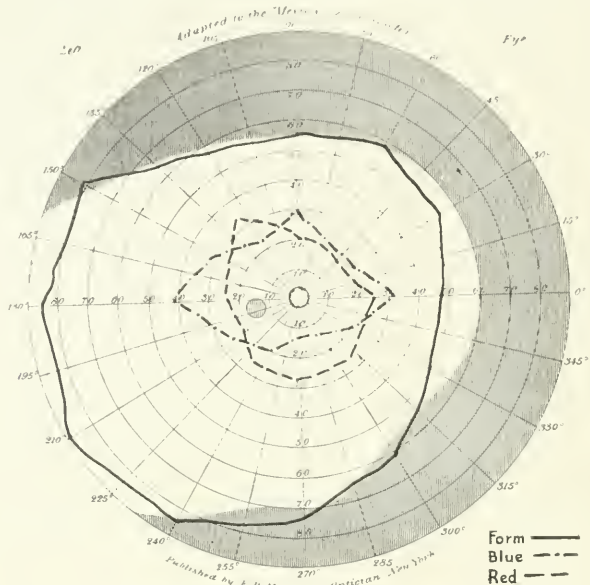


FIG. 1.—To illustrate colour interlacing. A case of cerebello-pontine tumour. Choked disc $1\frac{1}{2}$ D.

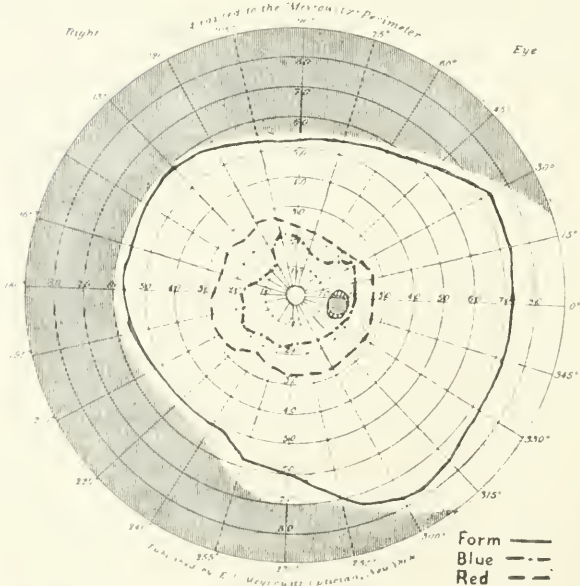


FIG. 2.—To illustrate colour inversion. Case of glioma of left frontal lobe. Choked disc 6 D.

ophthalmoscopic changes. Following decompressive operations, these changes disappeared, and we concluded that their presence must in some way have been dependent upon increased intra-cranial tension (Fig. 4).

The foundation for the diagnosis of incipient choked disc lies mainly in our ability to recognize the alterations in disc and field to which I have so briefly referred. I would not have it inferred from what I have said that this is an easy task, for well do I know that many cases present complications, the significance of which can be determined only by patient study. Nor would I

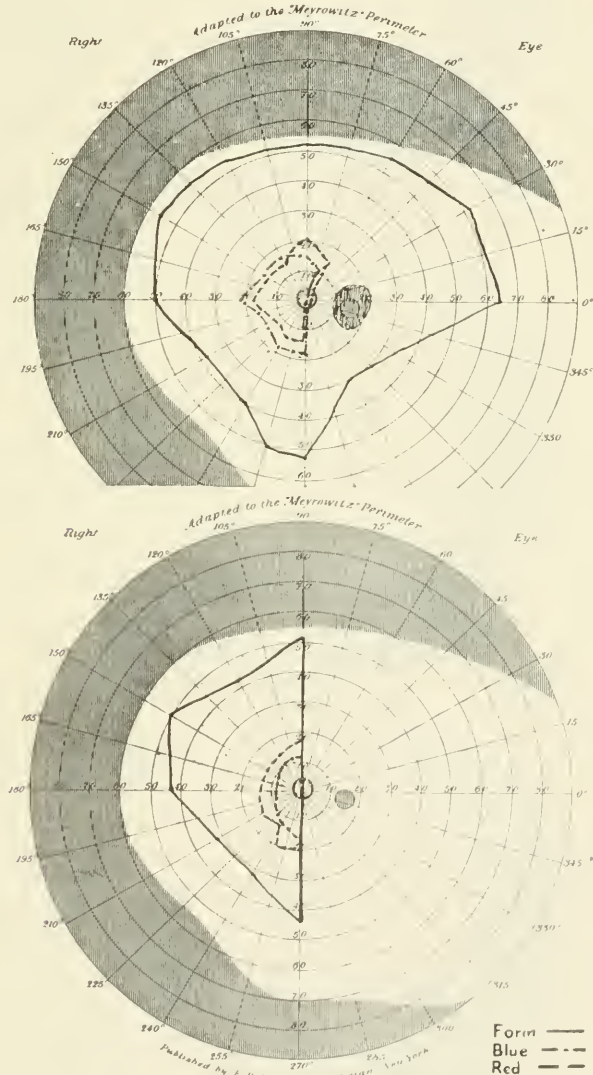


FIG. 3.—To illustrate the progress of hemianopsia. Chart 1. Colour interlacing in one-half of the field, achromatopsia in the opposite. Chart 2. Fourteen days later. In place of colour interlacing there is colour inversion. Complete hemianopsia has succeeded hemiachromatopsia. A case of glioma of left parietal region. Choked disc 4 D.

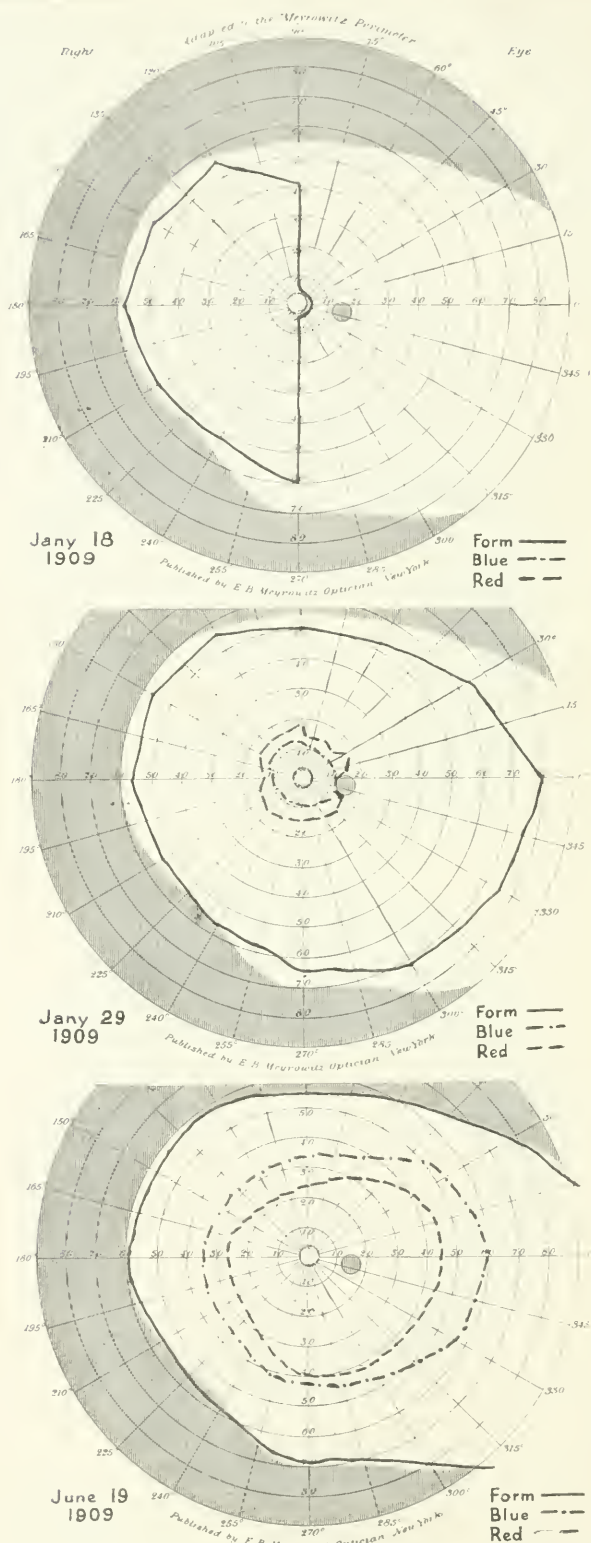


FIG. 4.—To illustrate the changes in the colour fields subsequent to sub-temporal decompression. Chart 1. Immediately before operation. Hemianopsia and complete achromatopsia. Chart 2. Nine days after operation. Form field practically normal, colour inversion. Chart 3. Complete restoration of fields for form and colours. A supposed case of tuberculoma of left occipital lobe. Headache, vomiting, choked disc $1\frac{1}{2}$ D.

advise an ophthalmologist in the study of choked disc to limit himself to his own observations. If I did I would be unmindful of the valuable assistance rendered me by my friends, the surgeon and neurologist.

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PROFESSIONAL BUILDINGS,
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CLINICAL MEMORANDA.

THE EFFECT OF THE COLOUR OF THE BLOOD IN THE BLOOD-VESSELS OF THE RETINA SEEN SUBJECTIVELY.*

BY

F. W. EDRIDGE-GREEN, M.D., F.R.C.S.

BEIT RESEARCH SCHOLAR.

IF we look through a blue-green glass at a uniformly illuminated white surface, as, for instance, a white cloud in the sky, for about 30 seconds, on removing the glass the whole of the field of vision appears rose, with the exception of the centre corresponding to the central non-vascular portion of the retina; this appears bright green.

EXPERIENCE WITH BUCHANAN'S CORNEAL MICROSCOPE.

BY

ERNEST THOMSON, M.D.,

SURGEON TO THE GLASGOW EYE INFIRMARY.

IN THE OPHTHALMOSCOPE, 1908, p. 957, will be found a description by Leslie Buchanan of the instrument designed by himself and designated a new portable corneal microscope.

My assistants at the Eye Infirmary and myself have now had a very considerable experience with this instrument since the time of its first production. It has become worn and soiled with much use. We can no longer do without it. My object in writing this note is to point out to ophthalmo-

* From the *Proceedings of the Physiological Society*, November 19th, 1910.

logists, what its designer is not likely to indicate, that it is a most excellent instrument, perhaps more particularly for the surgeon who is emmetropic or hypermetropic and no longer under forty. It can be used, and habitually is used, in front of the surgeon's own glasses, and the degree of ease and accuracy with which the most minute foreign bodies can be removed from the cornea with the minimum of laceration, need only be once learned to be fully appreciated. The instrument has the following advantages: (1) The eye pieces are sufficiently far from the surgeon's eyes to permit of the surgeon wearing his correction. (2) The surgeon can look through the instrument, or can, by a slight movement of the head, look below it; this is a most useful feature. (3) The picture is stereoscopic. (4) The working distance is long (about 3 inches). (5) The instrument is adjustable for width and the prisms can be rotated.

I have said nothing about the use of this magnifier for other than operative purposes, since, if it is good enough to operate with, it is obviously good enough for observation purposes, within the limits of its magnifying power of about three diameters. I have not employed the electric illuminating attachment, which may be obtained with the instrument if desired.

The makers are Messrs. R. & J. Beck, Ltd., London. The price is two guineas, without the electric attachment.

NOVELTIES.

IONTOPHORESIS IN EYE WORK.

MORE than one reference to the practical value of electrolytic treatment, or iontophoresis, in affections of the eye has been made in recent numbers of THE OPHTHALMOSCOPE. In particular, the work of Wirtz (*Klin. Monatsbl. f. Augenheilkunde*, 1908 and 1909) has been described (see THE OPHTHALMOSCOPE, 1909, p. 282, and 1910, p. 53). Several enquiries have been addressed to us as to the exact *modus operandi*. This leads us to describe briefly the method adopted by Dr. Wirtz, fuller details of which may be sought, by those interested, in a pamphlet on *Ophthalmic Electrodes*, issued by Messrs. K. Schall & Son, of 75, New Cavendish Street, London, W.

General considerations.

Some elementary knowledge of the chemical composition and of the electric charge of the ions of the electrolytes is essential. The kathions are driven into the tissues of the eye by the anode, and the anions by the kathode. The kathions include (1) the metallic molecules of salts, such as the Na of NaCl, the Zn of ZnSO₄, the Cu of CuSO₄, and so on; (2) the hydrogen of acids—for example, the H of HCl, etc.; and (3) the alkaloids. The anions include (1) the acid radical of salts, such as the Cl of NaCl; (2) the hydroxyl of bases, such as the OH of sodium hydrate; and (3) the organic acids.

The electrolytical solutions must be dissociated as much as possible, and, speaking generally, half per cent. to two per cent. solutions will be found to be the most suitable. In order to eliminate everything that might influence in any way the exchange of ions, the electrodes must contain only such electrolytic substances as are to be applied. Thus, solutions must be prepared with the purest distilled water, and the electrodes and the material employed to absorb the solution must be perfectly clean. The gauze impregnated with the solution to be driven into the tissues, the so-called "electrode cushion,"

must be of uniform thickness, and so thick that the ions, where it comes into contact with the metal plate, cannot penetrate into the tissues during the application.

Special considerations.

Some special considerations call for mention before actually describing the application of iontophoresis to the human eye. In the first place, care must be taken not to employ too concentrated solutions. Next, whenever the conjunctival sac is to be treated, the tears must be thought of. The lacrymal fluid, indeed, is an electrolyte, on account of its contained sodium chloride. It must, therefore, be looked upon as an equal to a solution of that salt. When the conjunctiva is treated, there is an active secretion of tears, owing partly to the mechanical irritation of the electrode in contact with the eye and partly to the very active ions employed in the treatment of affections of the conjunctiva. Then, there is the influence of the cocaine, used as a local anæsthetic before the application, to be thought of. The kathions of cocaine are very active as regards the cornea. After the kathions have been driven

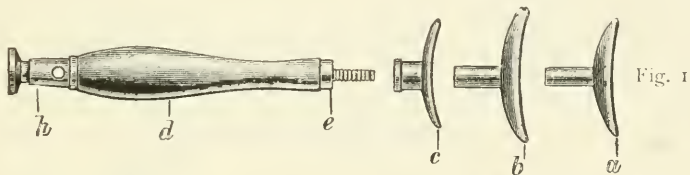


Fig. 1

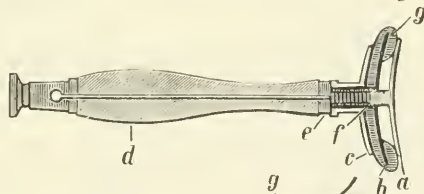


Fig. 2

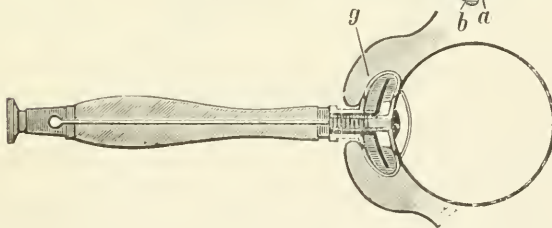


Fig. 3

into the eye, a few minutes must be allowed to elapse, and then the conjunctival sac must be well washed out after cocainising and before electrification. The remaining amount of cocaine has been found by experience to be of no further importance.

Whatever part of the eye is to be treated by ionic medication, certain apparatus is needed. Current may be obtained from several sources—as, for example, from an 18- to 24-cell Leclanché battery, or direct from the main. In the latter case a shunt rheostat is necessary, so that current can be reduced or increased without producing shocks. A milliampèremeter, of course, is a necessary part of any equipment for iontophoresis. With regard to strength of current, Professor S. Leduc (*Electric Ions, and their Use in Medicine*, 1908) recommends a current of from 1 to 2 m.a. per square centimeter surface of the active electrode, but in eye work it is probably not advisable to exceed the strength first named. Wirtz in his first series of cases experimented with zinc sulphate $\frac{1}{2}$ per cent., sodium iodide

1 per cent., sodium chloride 0.9 per cent., and copper sulphate $\frac{1}{2}$ per cent. These solutions he allowed to act as a current of 2 to 4 m.a. for periods ranging from 1 minute to 3 minutes. In his second series, zinc-ions were allowed to act in corneal ulcers at $\frac{1}{2}$ m.a. for $\frac{1}{5}$ to 1 minute; in obstinate cases of blepharitis at 3 to 5 m.a. for from 3 to 5 minutes; and in corneal opacities, chlorine-ions were used at 3 m.a. for from 2 to 3 minutes.

Treatment of the conjunctiva.—The patient is seated. The conjunctiva is rendered anæsthetic in the usual way with cocaine. The special electrodes employed by Dr. Wirtz are shown in Figs. 1, 2, and 3. Each is made up of four loose parts, *viz.*, (*a*) a celluloid cup of convenient shape for protecting the eyeball; (*b*) a metal cup which bears the electrode; (*c*) a celluloid cup for protecting the edges of the eyelids; and (*d*) a celluloid handle, provided with a screw-plug (*e*) and a clamp (*h*). Some ten layers of gauze are shaped to the oval form of the electrode (*b*), as well as a piece of unglazed paper. They are perforated in the centre, and placed in position over the electrode. The protecting cup for the eyeball is pressed on from the inside, and the protecting lid cup from above, and the gauze is thus fixed. The individual

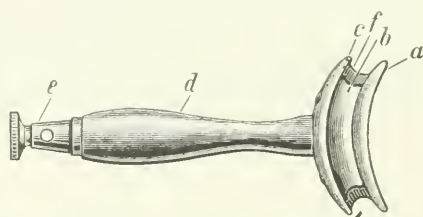


Fig. 4

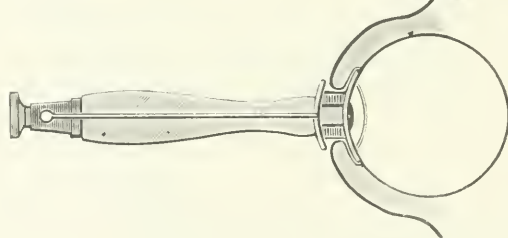


Fig. 5

parts are connected with one another by the screw-plug of the handle of the instrument. The last-named is screwed into the thread of the protecting plate for the eyeball until its head presses against the tubular shoulder of the metal plate. Current can now pass through the handle to the electrode and through the electrolyte contained by the gauze into the conjunctiva.

In order to introduce the electrode, the upper lid is everted, the upper edge of the electrode placed on the upper edge of the tarsus, and the lid turned back on the superior transitional folds. The patient is now asked to look upwards, when the lower half of the electrode may readily be slipped behind the lower lid by bending the handle of the instrument a little downwards. To remove the electrode, the lower lid is pulled down, and the handle of the instrument lifted upwards. In this way the electrode slips first out of the lower and then out of the upper conjunctival *cul-de-sac*.

Treatment of the edges of the eyelids.—Figs. 4 and 5 show the special electrode devised by Wirtz for treating the edges of the eyelids and its method of use.

Treatment of the cornea.—The corneal electrodes, as shown in Figs. 6 and 7, consist of the cup (*a*) of celluloid and the head with the handle (*b*) of the same material. The cup, which serves for the reception of the

saturated gauze, has a rounded rim at its top and a thread (*d*) in its interior. A metal pin through the handle joins the zinc plate (*c*) with the clamp (*f*) of the instrument. For use the electrode is arranged in the following way.—Ten to fifteen layers of soft gauze (bigger by one-half than the diameter of the cup) are placed at the lower end of the cup, and then pressed forward with the handle of the instrument until the material appears as a tip at the upper opening of the cup (*g*). The head is next screwed on, and the gauze saturated with the solution to be employed. By means of the small appliance shown in Fig. 8, the protruding cushion of damp gauze is moulded to the form of the cornea (*h*). Wirtz has designed three smaller corneal electrodes intended for the treatment of limited parts of the cornea or of children's corneæ.

When iontophoresis is to be applied to the cornea, the patient lies down, and the eye is anaesthetised. The surgeon places the indifferent electrode in the patient's hand and tells him to press it into the bend of his other arm. The eye is held open by a speculum. The electrode is then placed gently

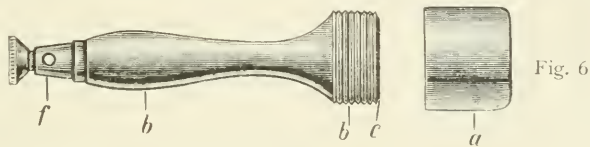


Fig. 6

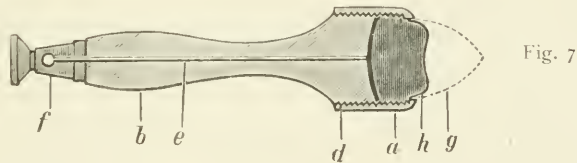


Fig. 7

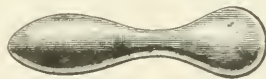


Fig. 8

upon the cornea, which can readily be held in place by light pressure with the instrument. With a little practice, it becomes easy to keep the watch, the galvanometer, and the cornea under observation at the same time, and thus to regulate the current. Dr. Wirtz makes a practice of covering the eye which has been treated with a light protective dressing for twelve hours, and, thanks to this precaution, he has never had any damage to the epithelium.

It may be added that electrolytic treatment has been employed by Wirtz, Stuelp, Zahn, Hagemann, Richter, Krailsheimer, Taylor and Jones, E. T. Collins, MacNab, Traquair, and Geiss in the following conditions:—trachoma, blepharitis ulcerosa, various forms of acute and chronic inflammation of the conjunctiva, Mooren's ulcer, hypopyon-keratitis, keratitis dendritica, diplobacillary ulcers of the cornea, nebulae, interstitial keratitis, and scleritis and episcleritis.

In conclusion, it may be said that the various electrodes mentioned in this communication can be obtained from Messrs. Schall & Son at a price of £2 6s. od. A suitable Leclanché battery costs £4 10s. od., and a milliamperemeter £1 10s. od. The entire outfit for ionic medication of the eye can be obtained, then, for about £8 6s. od.

TRANSLATION.

INDICATIONS AND COMPARATIVE VALUE OF PERFORATING SCLERECTOMY:

- (a) without iridectomy;
- (b) with peripheral iridectomy;
- (c) with ordinary iridectomy,*

BY

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THE subconjunctival fistulisation of the eye is the essential aim of the operation for glaucoma which we bring forward, and we consider that this fistulisation should be obtained with the least possible interference with the uveal tract; we are desirous to allow the eye easily to excrete its excess, or at least as easily as possible, and to do nothing which can cause an increase of this excess. It is possible to open the globe beneath the conjunctiva and in front of the iris, and to excise a piece therefrom, without touching the uveal tract; but do we not run the risk of seeing the iris carried into the wound, and included there, thus to become a cause of grave mishaps. Up to what point do we run these risks? In what form of glaucoma is this inclusion avoidable? What are the precautions to take in order to fistulise the eye without danger? Which is the best *technique* in performing sclerectomy? These are the questions which I propose to answer in this article.

My operation for glaucoma has been divided by Pagenstecher¹, of Wiesbaden, into three sub-divisions, which appear to conform well with the exposition of the subject, and I borrow this eminent colleague's classification:

Sclerectomy of Lagrange:

- (a) without iridectomy,
- (b) with peripheral iridectomy,
- (c) with ordinary iridectomy.

This division will form the headings of the three paragraphs which this article comprises.

(a) Perforating sclerectomy without iridectomy, or simple perforating sclerectomy.

Simple perforating sclerectomy, so-called, must not be confused with the simple anterior sclerectomy advised by Bettremieux after we had pointed out the utility of a large subconjunctival scleral resection. We consider it absolutely essential to open up the anterior chamber, and to allow the aqueous to pass easily beneath the conjunctiva; a narrow opening should suffice, but a wide opening is of much more value, and its effect is much more lasting, especially if it happens that the eye is of feeble hypertension, where the lips of the wound do not gape at the time when the anterior chamber is re-forming.

* From *Archives d'Ophthalmologie*, septembre, 1910.

This sclerectomy should have the following chief characters.—It must be wide, be in relation to the filtration-angle without ceasing to be subconjunctival, and approach as nearly as possible to the cornea, *i.e.*, the ciliary body must be left alone, and the incision made in the most anterior part of the sclera.

It is because the sclerectomy should be wide that we do not consider it our duty to recommend the small openings made by the trephine in the region of the filtration angle, such as have been recommended by Fergus², Elliot³, Stephenson⁴, and some other English and American⁵ authors. Doubtless, if the circular opening made by the trephine is large, a large piece of sclera can be removed; but the opening, which should be always subconjunctival, will of necessity encroach more or less on the ciliary region. It is of greater value to make the excision in an elongated manner, as by the scissors or the punch-forceps of Vacher. The loss of tissue, prolonged transversely, is thus made at the expense of the filtration-angle itself, and there is no doubt that this is the best place. We think that it is necessary to make, as far as possible, a communication between the choroidal spaces and the anterior chamber, and therefore with the scleral opening. To effect this it is sufficient to make the scleral incision opposite the ciliary tendon, *i.e.*, exactly in front of the root of the iris. The supra-choroidal space begins there, and it is better to open it in this position widely by a long opening parallel to the equator of the eye, and to the base of the cornea, than to open it further back towards the ciliary muscle and the ciliary region. This region, in particular, calls for respect, for it plays an essential part in the nutrition of the eye, and is prompt in defence when assailed too closely. Further, any scleral opening made close to the ciliary body is not in its right place. The opening must be in connection with the anterior chamber, immediately in front of the iris, directly behind the cornea, and always beneath the conjunctiva, which must be kept as thick and protecting as possible. To repeat, then, it is necessary to establish an angle of fistulisation in place of the angle of filtration.

The best instrument, the simplest, and surest to obtain this result appears to us to be the curved scissors which we have had made by Luër; but we are far from denying the interest of the modifications which have been brought forward by a large number of authors, *e.g.*, Holth, Dor, and Jacqueau.

Holth⁶, having made the scleral incision with the knife or, preferably, the keratome, resects from the anterior lip of the wound a portion of sclera 1·5 mm. by about 3 mm., using modified Vacher's punch-forceps. In the same way, making use of this instrument, Dor⁷ recommends the following *technique*.—Corneal incision, simply taking care to bring the knife out beneath the conjunctiva, but without troubling to make a slanting scleral incision; the edge of the conjunctival flap is turned down on the cornea, the punch-forceps are introduced so as to grip the posterior lip of the wound, the male branch engaging in the irido-corneal angle and pressing against the bottom of the angle, then section of the scleral tongue. At this moment, there is very often produced a small hernia of the iris, which is resected after cocainising, and then the conjunctival flap is returned to its place.

Jacqueau⁸ proceeds in the following manner.—After having performed a classic iridectomy, with a large conjunctival flap, scissors, light but resisting, with the ends slightly curved and blunt, are made use of. One branch is slipped beneath the sclera for a distance of about 2 mm., and a section made in the posterior lip of the wound obliquely upwards and inwards. The internal lip of the scleral incision is then slightly raised by means of a small pair of forceps, so as to be able by a second cut of the scissors (placed this time flatwise), to remove a slice of sclera. The loss of substance has thus the

form of a V of the size one wishes to obtain. The conjunctival flap is then replaced.

The resection, as Hoth advises it, is correct ; but the attempts of Dor and Jacqueau, of which the future will speak better than we are now able to, are,

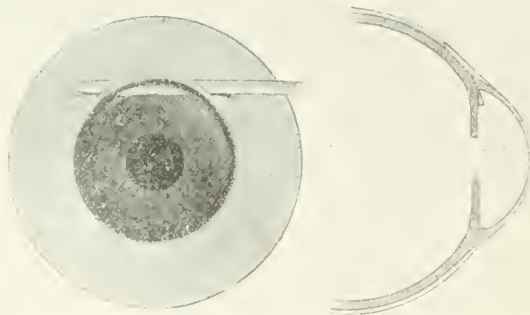


Fig. 1

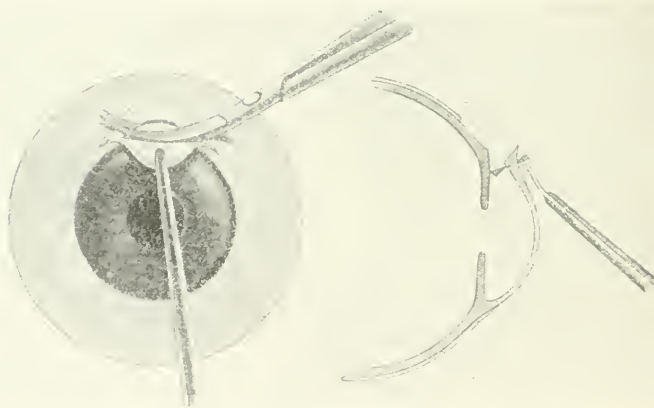


Fig. 2

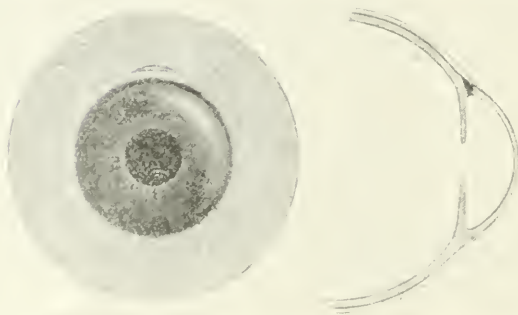


Fig. 3

I think, wrong, inasmuch as the resection is made in the posterior lip of the scleral incision. It is, perhaps, not very important to use this or that instrument, but the situation of the resection plays a part of the first order in the result, and it is on this point we feel emphasis should be laid.

The three figures will make our *technique* understood, so that it will not be necessary to describe in this place the different stages of the operation.

It will be noted that the knife shaves the base of the iris in such a manner as to divide as much as possible of the tendon of the ciliary muscle, and consequently to open up the choroidal spaces; also, that the scleral incision is narrow and elongated in the direction of the filtration angle. Such is the *technique* of the simple perforating sclerectomy. It is certainly an important portion of our article, but not the most difficult to explain; it is a much more difficult matter to say in which cases of glaucoma one should make use of simple perforating sclerectomy.

Indications for perforating sclerectomy without iridectomy.

In what cases theoretically, *à priori*, is simple perforating sclerectomy indicated?

They are the following :—

1.—Cases of glaucoma with intermittent hypertension, or with very slight constant hypertension.

2.—Those in which iridectomy is recognised as dangerous—that is to say, glaucoma in which the visual field borders on the fixation point.

3.—Those which occur in subjects suffering from well-marked neurosis, in whom section of the iris may produce in the visual apparatus inhibitory phenomena, still unexplained, but definite.

4.—Hæmorrhagic glaucoma, in the rare cases in which one considers it necessary to have recourse to intraocular intervention.

5.—In the cases of glaucoma coincident with an adhesion of the iris, such as will necessarily prevent prolapse of this membrane. Terson⁹ has lately insisted on this point, and we have already several times performed this operation in like cases.

Simple perforating sclerectomy is, on the contrary, always contraindicated when the hypertension is sufficiently great to be a source of fear of prolapse of the iris into the wound—that is to say, in all chronic glaucomas with tension constantly at +1 and over, and in such cases there is all the more need to have resort to iridectomy, inasmuch as this operation has, by itself alone, produced in the cure of glaucoma results certainly well appreciated by all clinicians, although, indeed, inferior to those of sclerecto-iridectomy.

Unfortunately, the tension of glaucomatous eyes is often variable, and such an eye, which on the eve of operation has feeble tension, T. + $\frac{1}{2}$, at the very moment of the intervention, may have its tension markedly and sometimes suddenly raised; that is why one ought not, before the operation, to have a very fixed plan of procedure. In the course of the operation, the lines of procedure should be modified, so that in place of a simple perforating sclerectomy, a sclerectomy, with a peripheral or total iridectomy, will be performed, according to the case.

As a rule, eyes constantly below T. +1 will merit a simple sclerectomy alone. Up to the present we have performed simple perforating sclerectomy in conformity with these theoretical rules. All the results, with the exception of one case, have been successful. These are our cases *in extenso*. They are worthy of record on account of the rarity of clinical reports of this kind.

Case I.—*Simple chronic glaucoma. Simple sclerectomy in right eye.*

Mme. C., 69, hereditary arthritic, very nervous, came to consult us at the beginning of November, 1907, for her right eye, in which for several months she had experienced the premonitory signs of glaucoma: coloured circles, complete loss of vision at times, intermittent sensation of fogs. I prescribed pilocarpine, purgatives, iodide of potassium, and the free use of milk. The condition became worse, and on December 11th the patient agreed to operation. Her condition is as follows:—R.E. +1.75 sph. V= $\frac{1}{2}$, T= $\frac{1}{2}$, L.E.+1.25 V.=1, T=normal. The visual field is a little contracted above and inwards. In the right eye the disc is slightly excavated.

December 11th, 1907.—Simple sclerectomy, after frequent instillations of adrenalin, eserine, and cocaine. The operation took place without any difficulty: the iris remains perfectly in place, and the patient leaves the private hospital eight days after with a reformed anterior chamber, and a very small sub-conjunctival "fistulette," with definite ampulliform swelling. At the end of January she returned in perfect health. The acuity equals $\frac{3}{4}$, and the patient no longer experiences in her right eye the phenomena which she complained of before the intervention. The tension is normal.

June 1st, 1909.—At the site of the sclerectomy there is to be seen a very definite loss of substance, together with swelling of the conjunctiva, moderate, not very marked; in the external angle of the wound is seen the scleral fistulette. The hypertension has disappeared +.50 cyl. at 90° V.=1 (barely). The visual field and colour sense are normal. Almost no excitation. No myotic being used. The patient indulges in as much reading as before the outset of her trouble.

Case II.—M. X —, 55, Bordeaux, numerous arthritic antecedents, is himself the subject of attacks of articular rheumatism, intercostal neuralgia, migraine, etc. The disease began five years ago. Whilst reading, he perceived that the sight of the left eye was impaired, then bit by bit it disappeared completely. In January, 1906, the same phenomena occurred in the right eye without pain or inflammation, a simple sensation of fog accompanied by a lowering of the acuity. He then came to consult us, and I prescribed myotics. Up to the 17th August, 1907, he followed this treatment, but the result was nil. At this time I noted the following condition:—R.E. +.50 C +.50 at 75° V= $\frac{2}{3}$ (barely), T= $\frac{1}{2}$ (barely). The disc is slightly excavated; the visual field is contracted outwards and below (20° and 35°); the colour sense is good. Simple sclerectomy was performed on the 17th August, 1907, according to our method, and without the least inclusion. He left the private hospital eight days after, with normal tension and a very visible scleral fistula.

April 5th, 1909.—He returned at our request, and we noted the following.—The loss of tissue has a linear form broader, however, in the middle. At this point the conjunctiva is not raised, it is of the flat type. There is no hypertension, the disc is still excavated. The acuity remains at $\frac{3}{4}$, the visual field is the same. Further, at the end of eighteen months, the condition remains stationary, and the patient declares himself able to read a great deal without apparent fatigue of the eye.

Case III.—*Simple chronic glaucoma. Simple perforating sclerectomy L.E.*

M. X. —, very nervous, diabetic, began to experience trouble in his left eye two years ago. He has consulted several oculists, who diagnosed simple chronic glaucoma and suggested operation. The patient calls particular attention to the contraction of the field below and inwards; he also mentions intermittent attacks of fog, during which he suffers from headache on the left side; he is, further, very concerned about his condition.

On June 3rd, 1907, I prescribed pilocarpine and general treatment suitable to his case, without any definite result. The 9th January, 1908, one notes: R.E. V=1, tension normal, L.E. V= $\frac{2}{3}$, T= $\frac{1}{2}$. Visual field normal in the right, in the left 50° outwards, 25° above, 10° below, 20° inwards. Colour sense good. Simple sclerectomy was performed on the 10th January, 1908, after our method, without notable incident. Eserine instilled twice daily for eight days. The fifth day, the pupil small and round, became a little out of shape above and caused fear of an inclusion; persevering with eserine, all was restored.

January 18th, M. X.—left the private hospital with a reformed anterior chamber and an evident —.075 scleral fistulette.

July 2nd, 1908, six months after, the visual field increased about 10° in every direction. The acuity is unity; the fistula, narrow, remains very visible.

February 4th, 1909.—With —.075, acuity equals 1; the tension is normal. The pupil is perfectly round and the cicatrix is visible as a small black line without ampulliform swelling of the conjunctiva. The patient is delighted with the result obtained. In June, 1910, two and a half years after the operation, the patient is in the same satisfactory condition.

Case IV.—*Simple chronic glaucoma, simple perforating sclerectomy R.E.*

Mme. F —, 72, arthritic and nervous, had experienced for a long time the ordinary phenomena of glaucoma. In the right, not only is the acuity lowered, but the visual field is contracted, and the patient is very wearied by intermittent foggings. She comes to consult us in April, 1908. We easily diagnose chronic glaucoma, for the patient presents all its symptoms, including contraction of the field and cupping of the disc. Treatment by myotics instituted without result.

The 20th May, 1908, simple perforating sclerectomy is performed in the presence of Dr. Bellot, chief medical officer of the Marine, Sub-Director of the School of Health of Bordeaux. On that day the condition of the patient is as follows:—R. V = $\frac{1}{15}$, T + $\frac{1}{2}$. The visual field is very contracted internally and especially above and below (within 40°, without 60°, above and below 10°). Very evident papillary excavation.

The operation took place without incident. From the 6th day I noted the re-establishment of the anterior chamber and the formation of a very evident scleral fistulette. The eye is relaxed, the iris in its place, without the least prolapse.

May 18th, 1909.—A year after, a cicatrix can be seen, as a black line, at the internal angle of which there is a slight conjunctival swelling. The scleral opening is about 4 mm. long by 1.5 mm. wide. The pupil is very round, tension normal. The acuity has improved considerably since the intervention: R.E. — 0.50 at 0° V = $\frac{1}{2}$ (barely). The visual field and colour sense are unaltered. Mme. F. uses no myotics.

September 23rd, 1909.—There does not exist the least inclusion of the iris, and the great improvement noted in May is maintained, as much from the point of view of tension as of visual acuity,

Case V.—*Simple double chronic glaucoma. Simple perforating sclerectomy R.E.*

M. L.—, 57, without noteworthy diathesis, but having lead a very troubled life, experienced 11 years ago the first symptoms of glaucoma after considerable worry. These phenomena asserted themselves more particularly in the morning after a bad night. The vision gradually diminished in both eyes, rather more quickly in the left than the right. The patient underwent treatment for two years, after a definite diagnosis had been made by one of our most distinguished colleagues, who advised against intervention and prescribed the use of myotics—eserine in oily collyria. At the end of April, 1908, he had been unable to read or write for two months, acuity in right is $\frac{1}{2}$ with—3, in left $\frac{1}{16}$ not improved by glasses. This left eye is useless, its visual field being reduced to a little slit in the outer part. In the right eye, the field is very narrow, elongated horizontally, as is common with chronic glaucoma patients. It is 12° within, 66° without, 12° above and below: the colour sense is fairly good. The tension is a little raised: T + $\frac{1}{2}$.

May 11th, 1908.—Simple sclerectomy in the right, in the presence of the patient's son, an interne des hôpitaux de Paris. The operation was performed with due regularity, and ere long a very fine fistulous cicatrix was established.

May 19th.—The anterior chamber is reformed, the patient leaves the private hospital with an obvious improvement in the visual acuity.

July, 1908.—We note the following: R.E. — 3 sph. + .75 at 0° V = $\frac{1}{2}$ and with + 2 sph. + .75 at 0°: the patient reads the ordinary characters of a journal; he has recommenced his correspondence.

May 14th, 1909.—There are times, says the patient, when the conjunctival ampulla, which is very distinct and in the form of a dumb-bell, is very voluminous. This excess is coincident with a lowering of the visual acuity: when the ampulla returns to its normal size, the visual acuity rises. The tension is not increased, the disc is less white, but the excavation persists. M. L. continues to use pilocarpine every second day. R.E. — 2.5 — 0.75 at 90° V = $\frac{1}{2}$ (barely); that is to say, a very noteworthy increase of vision has been obtained. As regards the visual field, it remains very narrow.

Case VI.—*Simple chronic glaucoma. Simple perforating sclerectomy R.E.*

M. G.—, 58, packer, presents no hereditary antecedents; at the age of 16 he received a pistol-shot, a piece of lead penetrating the left eye and causing its loss. For about a year, he has perceived at times that a fog obscured the vision of the right eye. But, without the least pain or inflammation this diminution of visual acuity has become worse in the past month. At the time when he came to consult us, 26th June, 1908, the condition was as follows:—

R.E. — 2 V. = $\frac{3}{4}$; T. + $\frac{1}{2}$. L.E. old traumatic cataract. The colour sense is preserved. The visual field measures above and within 50°, below 65°, without 80°. There exists a slight glaucomatous excavation.

The 24th June, 1908, in the presence of Dr. Brunetière, simple sclerectomy was performed without noteworthy incident. Eight days after, the patient quitted the private hospital with a cicatrix acting normally and a normal tension.

Succeeding examinations have given the following:—

13th August, 1908.—R.E. — 1.50 — .50 at 90° V. = 1 (barely).

June November, 1908.—R.E. — 1.50 — .50 at 110° V. = 1 (barely). Tension normal.

June 20th, 1909.—A year after, there exists a considerable swelling of the conjunctiva; this ampulla is so marked that it lifts up the upper lid; by transparency, the loss of scleral tissue by which filtration is effected can be seen. At times, usually the evening, it is very voluminous, and coincident then with a rush of hypertension; this increase in size disappears after some hours of rest. This cicatrix is distinctly remarkable for its aspect and its action. The pupil is perfectly round, the tension normal. R.E. — 1.50 — .50 at 110° V. = 1 (barely).

The visual field remains the same. M. G. has never used myotics, and expresses himself delighted with the result. April, 1910.—The tension is maintained at normal, the acuity at 1 (barely). Same appearance of the pupil and the scleral fistula. M. S.— was operated on twenty-two months ago.

Cases VII and VIII.—*Simple chronic glaucoma. Double simple perforating sclerectomy.*

M. X.—, 49, is an avowed rheumatic. He had, even at the age of 15 years, somewhat grave cardiac complications, in the course of rheumatic attacks. Very nervous and very frightened at the prospect of the operation, he presents on each side symptoms of simple chronic glaucoma; he had consulted one of our colleagues elsewhere, who had very wisely advised intervention, for in his case pilocarpine failed to arrest the disease. R.E. still had a visual acuity close to unity, L.E. V. = 1; on each side the tension was a little raised (T. + $\frac{1}{2}$) and the patient experienced, in the left especially, a sensation of constriction, of painful and besetting weight; the visual field, on the left side, had the classic contraction.

On 22nd August, 1908, I performed simple sclerectomy on the left. Immediately after this the eye was relaxed, the patient was eased on that side, the visual field increased 10° within, and the visual acuity, taken a month after the intervention, was $\frac{1}{2}$. As regards the right eye, notwithstanding pilocarpine,

M. X—, experienced again all the wearisome symptoms of chronic glaucoma with rapid diminution of vision from 1 (barely) to $\frac{1}{2}$, and even to $\frac{1}{4}$ on the 21st September. Visual field nearly normal. Improvement, then, in the left, the side operated on; rapid diminution of acuity in the right.

Simple sclerectomy in R. E. on 26th September. Sequelæ normal. No inclusion of the iris.

Three weeks after, V. = $\frac{1}{10}$, easily explained by the appearance of multiple retinal hemorrhages. Since then, on several occasions I noted a recurrence of these troubles, but the visual acuity, however, showed a tendency to improve. The 2nd June, 1910, whilst at work, he perceived that his vision became rapidly and almost completely blurred (apoplexy of the vitreous). On the days following there was a noteworthy improvement. But on the 20th another relapse. He came to see us two days later. There exists a large hemorrhage in the vitreous on the way to absorption. Visual acuity is $\frac{2}{100}$. Tension is normal. The scleral fistulette is very obvious with a slight ampulliform swelling. Beyond a slight dilatation of the pupil, the iris is well in place, without inclusion. In the left V. = 1, tension normal. The cicatrix acts perfectly; it has the form of a black gap, without swelling at its site. The acuity, however, has diminished by one-half since the last examination. There are also, in this eye small disseminated hemorrhages.

Case IX.—Double chronic glaucoma. Simple perforating sclerectomy R. E.

M. X—, 66, arthritic, very nervous, experienced in the month of January, 1908, the premonitory phenomena of glaucoma (coloured circles, fogs, violent headaches, etc.). In the month of October, there occurred a truly sharp attack on both sides which yielded only to prolonged treatment by pilocarpine. Since then the symptoms have passed to the chronic stage, but, notwithstanding myotics, the phenomena continuing to increase, the patient agreed to operation on the right side. On the 21st October, 1908, the tension was definitely increased on both sides; there existed a double papillary excavation and R. E. + 4 V. = $\frac{1}{3}$ (well), L. E. + 4 V. = $\frac{1}{3}$ (well). The visual field measures, on both sides, 45° above, 50° within, 60° below, 80° without.

On the 22nd October, after prolonged use of eserine, I performed simple perforating sclerectomy on the right side. The iris did not stir. Sequelæ normal. The patient left the private hospital with the eye relaxed and the anterior chamber re-formed. In January, 1910, I saw M. X—, again. In the left, same condition, V. = $\frac{1}{3}$ (barely). In the right, a very definite scleral breach is seen without any very definite ampulliform swelling. The tension is normal. The acuity is $\frac{1}{2}$ after correction of hypermetropia. In fact, an excellent result.

Cases X and XI.—Double chronic glaucoma. Double simple perforating sclerectomy.

Mme. Vve. B—, 76, came to consult me at the St. André Hospital on the 17th August, 1908. For seven months, she had perceived that her vision had sensibly diminished on both sides, chiefly the right. Cloudings, coloured circles, etc. During the last few days the diminution of the acuity had become very marked. On that day, the right eye had very increased tension: T. +1 (fully), the acuity is $\frac{1}{4}$; the visual field is 30° within, 40° above, 50° below, 70° without. In the left eye the tension is less high: T. + $\frac{1}{2}$; the acuity is $\frac{1}{2}$. The visual field is 60° within, 40° above, 80° below and without. On both sides, the colour sense is retained: on both sides also there is a very pronounced papillary excavation.

On the 17th August, 1908, after considerable use of eserine, I performed on the right eye simple perforating sclerectomy, contenting myself with removing a very small piece of sclera, on account of the very high tension, and thinking that a minimal opening would amply suffice.

On the 19th August, I made a large simple sclerectomy on the left eye. In this eye, as in the other, the sequelæ were excellent, not the least inclusion of the iris, very round pupil, the anterior chamber rapidly re-forming.

Having no further news of the patient, we wrote her 14 months after the double operation. In reply she told us that the acuity of the right eye continued to weaken, whilst it was well maintained in the left. This case is very interesting, for it shows very clearly how useful it is to make a wide opening in the scleral envelope. On the side where the scleral incision was very small, there was no result because there had been no fistulisation; there was, on the contrary, a good result with the other side, probably because the wide scleral excision had caused good fistulisation.

Cases XII and XIII.—Double chronic glaucoma. Double simple perforating sclerectomy.

M. Pierre D—, joiner, came to the St. André Hospital on the 1st December, 1908. Nothing worthy of mention in his hereditary antecedents; arterio-sclerosis. Six years ago, intermittent obscuring of vision on the left side, fogs, coloured circles around lights, slow diminution of acuity. Two years ago, the same symptoms appeared in the right. Never the least pain.

R. E. T. + 2 $\frac{1}{2}$, V. = $\frac{1}{20}$ (barely). Pupil not reacting to light. Grey and very excavated disc. Visual field measures above 10°, within 25°, below 40°, without 55°. Colour sense preserved. L. E. T. + 2, V. = $\frac{1}{4}$. Disc very cupped. Visual field is above 40°, within 60°, below 60°, without 70°. In fact, chronic glaucoma with hypertension and very marked papillary excavation. Eserine instilled at four intervals. The following day, tension fell in R. to T. + 2 (feeble), in L. to T. + 1.

December 2nd, 1908.—Simple sclerectomy on both sides. I removed a larger piece of sclera from the left than the right. Subsequent events normal.

December 17th.—Tension normal in the two eyes. Iris in its place without the slightest inclusion. The acuity has increased in a very definite manner, especially in the right. R. V. = $\frac{1}{6}$ (good). L. V. = $\frac{1}{2}$.

July 22nd, 1909, to December, 1909. Tension normal. On the right side, the pupil a little irregular: the sphincter appears a little drawn towards the wound, without, however, any inclusion. The scleral fistula is very visible (3 or 4 mm. long) with slight ampulliform swelling of the conjunctiva.

On the left side, pupil very round; loss of tissue much more visible (length 5 or 6 mm. about), no swelling of the conjunctiva. R.E. +1.25 at 180° V. = $\frac{1}{3}$ (good), L.E. V. = $\frac{1}{2}$. Visual field the same. Excellent result on both sides.

Case XIV.—*Double chronic glaucoma. Simple sclerectomy R.E., sclerecto-iridectomy L.E.*

M. X—, 65, farmer, noted by chance ten years ago that the sight of the right eye had diminished. Since then, progressive weakening of the acuity without any subjective phenomena. For three years past the left eye has suffered in the same way, and at the present time M. X— is unable to do any work. The 7th December, 1908, when he came to consult us, we record the following condition: the tension is a little above normal on both sides; there is double papillary excavation, not very marked, chiefly in the right. R. V. = $\frac{2}{3}$, L. V. = $\frac{1}{4}$ (barely). The visual field is 10° in every direction in the R.E., in the left it measures 30° within and above, 20° without and below. The colour sense is maintained, except for green.

On December 8th, 1908, I performed a simple perforating sclerectomy on the R. side, and on the 12th a sclerecto-iridectomy on the left side. Sequelæ excellent.

January 11th, 1909. — Tension is normal on both sides; on the right the iris is in place; pupil round without inclusion; slight ampulliform swelling of the conjunctiva over the two scleral fistulæ, which are very visible. R.E. +.50 at 90° V. = $\frac{1}{6}$. L.E. V. = $\frac{1}{3}$ (well).

January, 1910.—Same satisfactory result, especially on the right side where the acuity now equals that of the other eye V. = $\frac{1}{3}$; there is indeed on this side a little hypotension; but there is not the slightest inclusion of the iris. Same visual fields. The patient uses no drops.

Case XV.—*Double chronic glaucoma. Simple sclerectomy R.E., sclerecto-iridectomy L.E.*

Mme. M—, 64, Berdeaux, presents no antecedent worthy of record. Ten years ago, began to experience on the right side the premonitory phenomena of chronic glaucoma: fogs, coloured circles, etc. During the winter (1908) she had had on this side an attack of subacute glaucoma.

For some time, the left eye had not been so good; some pain with fogging at times like the other.

May 13th, 1909, on the right side, the tension is equal to +1; the papilla shows a characteristic cupping, the acuity is R. E. +2.5 = $\frac{1}{2}$. The visual field measures 50° above and below, 40° within, 85° without. Good colour sense. In the left, tension is slightly increased, good field and colour sense, very slight excavation. L.E. +2.5 = 1.

Sclerecto-iridectomy was performed on the right eye on the 14th May, 1909. Simple perforating sclerectomy on the left on July 17th. Subsequent events excellent on the two sides.

27th September, 1909, the condition is as follows:— R. E. Tension normal. Very visible opening of 3 to 4 mm., without conjunctival swelling, R. E. +3 V. = $\frac{1}{2}$. Same visual field. L. E. Tension normal. Sclerectomy very definite without ampulliform swelling. No iritic inclusion, pupil round, L. E. +2.50 +.50 at 0° V. = 1. Mme. M— uses no drops, and has not been troubled since the two operations, with which she expressed herself very pleased. Seen again on several occasions, in particular quite recently, the patient presented the same satisfactory result as that above-mentioned.

Case XVI.—*Double chronic glaucoma. Simple sclerectomy R.E., sclerectomy with peripheral iridectomy L.E.*

M. X—, 74, whose mother and one brother suffered from chronic glaucoma, has for a long time suffered from pains in the head and around the orbit. By chance, on closing the right eye, he noticed, about two months ago, that the whole of the left visual field has disappeared except on the outer side. Cloudings, coloured circles. For some time the right eye has not seemed so good. Examined on the 24th June, 1909: R. E.—Tension normal.—1.50, V. = $\frac{2}{3}$. Slight cupping. Field measures 80° without, 50° above and below, 40° within. Good colour sense. L. E.—Tension equal to + $\frac{1}{2}$, V. = $\frac{2}{3}$. Definite cupping. Visual field measures 80° without, 10° above, below, and within. Colour sense retained.

I performed simple sclerectomy on the left eye on the 30th June; operation normal.

The following day, the patient, very emotional and having wept all day, had a slight attack of acute glaucoma on both sides; dilated pupils, eyes painful and injected. The iris of the operated eye had a tendency to become included, the pupil being pyriform. Notwithstanding repeated instillations of eserine during the two following days, the iris was unable to recover its shape. It was apparently kept in this position by the accumulation of liquids in the posterior chamber.

On July 2nd, I made, with De Wecker's scissors, a very small incision in the portion of the iris which showed prominently in the scleral resection. Directly afterwards, the iris regained its place; the peripheral incision being scarcely visible. In the right eye, after frequent instillations of eserine, simple perforating sclerectomy. At the moment of the scleral incision, abundant hæmorrhage, explained by the acute attack of the day before. The piece of sclera removed was not so large as that removed from the left eye, the iris had no tendency to inclusion. Sequelæ of operation normal.

19th April, 1910.—Tension is normal on both sides. On the right no fistula apparent, the pupil is quite round, but the section in the sclera is scarcely visible. V. = $\frac{2}{3}$ with—1.50.

On the left side, great swelling of the conjunctiva, pupil a little more contracted; the peripheral "buttonhole" can be very well seen. V. = $\frac{2}{3}$. The visual field remains the same. The colour sense is good. M. X—, very satisfied with the result obtained, still, however, frequently complains of pain in the frontal region. July, 1910.—Patient seen again. Same satisfactory result on both sides as regards tension, as well as vision.

(b) Perforating sclerectomy with peripheral iridectomy.

In our operation for glaucoma, we emphasise the cutting of the tendon of the ciliary muscle, and we go so close to the anterior surface of the iris that in a number of cases it has come about that we have made at the base a small incision, giving the idea that a narrow iridectomy has been performed. We have never observed that this incision in the base of the iris caused the least trouble in simple perforating sclerectomy: it may be so if an iridectomy be desired, for it is possible for the forceps, entering the iridic opening, to go astray behind the iris, and so to bruise the lens.

After simple perforating sclerectomy, this iridic button-hole has great advantages; it is probable, indeed, that this small opening prevents prolapse, because aqueous humour cannot, after the operation, accumulate behind the iris and force it into the wound. This iridic opening it is that Holth, of Christiannia, in an excellent article, has defended. In it, having set forth the reasons which led him systematically to practise inclusion of the iris in the treatment of chronic glaucoma, Holth rejects the procedure, and accepts our ideas on the formation of a permanent fistula by the removal of a piece of sclera. He does not, however, agree with our incision with the knife, having witnessed three expulsive hæmorrhages after rupture of the zonule. After separation of the conjunctiva as far as the limbus, he perforates the sclera, and, as we have said before, he introduces in the anterior lip of the incision the punch-forceps of Vacher, and removes a piece 3 mm. long by 1.5 mm. broad. If the iris prolapses, an ordinary iridectomy is performed, without attempting reduction; if it remains in place, as is the rule (pilocarpine, not eserine), one "may be satisfied with a small extra-sphincter iridectomy, which is enough to avoid all iridic prolapse." He considers sclerectomy in the posterior lip of the wound as being less satisfactory, because it is not lasting, the subconjunctival tissue being more easily able to proliferate in the wound and obstruct it.

Holth's idea appears to us to be, *a priori*, a very happy one; for we have obtained very good results by making, as he does, a peripheral button-hole in the following cases:—

Case XVII.—*Chronic glaucoma R.E. Sclerectomy with peripheral iridectomy.*

Marie E.—, manageress, 51, Bordeaux. No noteworthy diathesis; nebule from infancy. For several years she has noted coloured circles in the right eye, and has been troubled with some headache. The acuity has always been medium, on account of the leucomata. But she complains of being much inconvenienced by the contraction of the visual field.

May 18th, 1908.—R.E. + 2 V. = $\frac{1}{4}$ T. + 1 (full), L.E. + 3, V. = $\frac{1}{3}$, T. normal. Right visual field, 10° within, 35° without, 15° above and below. Glaucomatous excavation. The anterior chamber is not very deep, and the irido-corneal angle relatively little accessible. On that day simple perforating sclerectomy was performed on the right, after much cocaineisation and eserineisation. The von Graefe knife, in cutting the ciliary tendon, encountered the iris pushed forward, and made a small button-hole in it. A very regular fistulous cicatrix was established, but the anterior chamber did not re-form until the 1st June. This patient was one of those in whom prolapse of the iris was to be feared, on account of the very marked hypertension; possibly, the small breach in the iris made by the knife saved the eye from this accident, by preventing the aqueous from accumulating behind this membrane.

May 19th, 1909.—Scleral fistula very evident, with very marked swelling of the conjunctiva. The ampulla even encroaches a little on the cornea. Apparently, by transmitted light, small openings giving communication with the anterior chamber can be seen. M. E.— complains of slight attacks of hypertension, which disappear, she says, very quickly. The tension is normal, the disc less cupped. R.E. + 3.5 at 45° V. = $\frac{1}{2}$ (feeble). No myotic. Evident improvement.

May, 1910.—Perfect action of the fistula. The condition is as in May, 1909. M. E.— is delighted with the result.

Case XVIII.—*Double chronic glaucoma; simple sclerectomy R.E.; sclerectomy with peripheral iridectomy L.E.*

(See Case XVI). This patient has had simple perforating sclerectomy in the right eye, and sclerectomy with peripheral iridectomy in the left.

Case XIX.—*Chronic glaucoma; double simple perforating sclerectomy, R.E., with peripheral iridectomy.*

M. D—, 58, began to lose insensibly the sight of the left eye a year ago. No pain, fogs, or cloudings. At the present time V. = 0, T. + 2. There is, however, a small slit in the outer part of the field, and a very deep cupping of the disc to be noted. For two or three months past the right eye has seen less clearly. He complains of a sensation of clouding and coloured circles; the pupil is a little dilated. No pain.

24th April, 1909.—The condition of the right eye is as follows:—Tension increased to + 1. V. = 1 (barely). The field is 40° above, below and within, 80° without; colour sense maintained. Rather marked cupping.

Some days later, simple perforating sclerectomy. The iris did not protrude, but, making the section very close to the iris, I cut its base, and caused a small peripheral button-hole.

5th June, 1909.—Tension normal; the fistula appears to be formed with ampulliform swelling very marked.

Sept. 23rd.—Not the least inclusion of the iris: pupil very circular. Large scleral fistula with conjunctival swelling more marked in the internal angle of the wound. The small opening is quite visible. The patient uses no drops. R.E. + 1 V. = 1 (scarcely).

April 6th, 1910.—Same satisfactory condition. The patient has no subjective symptoms, and is delighted with the result. The small opening in the iris can be very clearly seen, surmounted by a loss of tissue in the sclera, without a conjunctival anipulla. T. normal. Acuity as before.

23rd August, 1910.—The result is maintained. V. = 1 (barely).

We have had, however, in operating after Holth's method, to regret one complication, which has proved very troublesome. We give the case *in extenso*, for we have special reasons in publishing it, and, furthermore, unsuccessful cases are the instructive ones.

Case XX.—*Double chronic glaucoma; sclerecto-iridectomy R.E., simple perforating sclerectomy with small peripheral iridectomy L.E.*

M. X—, age 43, arthritic and very nervous, has presented, since 1903, very evident symptoms of glaucoma. The affection began in the right eye with foginess, and coloured circles, which the patient still complains of, less marked however, than formerly. Some months after the right, the left eye shewed the same classical signs of chronic glaucoma. Since 1904, M. X— has experienced in both eyes more or less markedly, all the signs of this disease. Hypertension, generally slight, is intermittent. For four years past, the patient has daily instilled pilocarpine, at first 1 per cent. then 2 per cent. and sometimes eserine, without preventing the vision from slowly diminishing and the field from gradually contracting, especially above and inwards in each eye. We saw the patient in consultation with Drs. Louis Dor and V. Morax in Paris, in May 1909, and it was agreed that if the medical treatment by tuberculin, advised by M. Dor, as also the use of myotics, did not arrest the progress of the disease, it would be necessary to perform sclerectomy. The visual field being very close to the fixation point, I mentioned at the time to the patient that iridectomy in similar cases is far from being without danger and that simple sclerectomy would be better suited to his trouble.

On October 11th, 1909, the patient came to Bordeaux. The local condition since the month of May is a little worse, and his general condition is not good. M. X— is troubled, as he always has been, with obstinate constipation; he is depressed, gloomy, and very anxious, indeed justly so, about his case. The visual acuity is as follows: R.E. + 0.75 = $\frac{2}{3}$ (good), L.E. + 0.50 = $\frac{2}{3}$ (good).

The visual fields are much contracted, especially above and inwards. The colour sense in both eyes is normal for red, diminished for green and blue; light sense is very feeble and for a long time the patient has complained of hemeralopia. The ophthalmoscopic examination shows on each side the classical excavation; the discs are rather white in each eye. On the 11th October, at the first examination made in our consulting room, and on the 12th at the private hospital, we did not remark any notable hypertension; and as the patient has great fear of iridectomy, it is agreed that we should perform on the following day simple sclerectomy, unless a prolapse of the iris should compel us to perform an excision of the iris.

October 13th, 1909, operation on the right eye. At the moment of mounting the operation table, the patient, who was in a very emotional condition, had increased tension; + 2 on both sides, notwithstanding much use of eserine and cocaine previously. Sclerectomy was performed in accordance with our usual procedure: scleral flap removed with the scissors in the anterior lip of the wound, but the iris prolapsed and we were forced to perform a small iridectomy, to the great disappointment of the patient who, on account of the condition of the field of vision, would have preferred, as we did, a simple sclerectomy. The anxiety of the patient with regard to the result of the iridectomy was such that we considered it fitting to read to him in his bed the case of Laqueur published at the time in *La Clinique Ophtalmologique* showing the good results of excision of the iris in a case somewhat similar to his own. The sequelæ of the operation were normal, and, "on the whole," successful. The acuity, however, did not increase,—on the contrary, for on the 21st February, 1910, when we again saw the patient, it was not more than + 0.75 at 40° = $\frac{2}{3}$ (barely), but the visual field was a little increased, and the intermittent hypertension had nearly disappeared. There existed a very definite, regular, and ordinary subconjunctival fistulisation with a fine ampulla. On that day, the 21st February, 1910, the patient had returned to Bordeaux to entrust to us his left eye. He came on his own account, without our asking him to do so in any way, his case being one of those which often invite complications on account of

the peculiarly nervous condition which, as with M. X—, overshadows all. We had thought for an instant of refusing to intervene again, but as it would be a gratuitous operation, done of our good-will, and as, in fact, it was possible to be of use to the patient, we again decided to give our services to M. X— who, on the 21st February, 1910, entered our private clinique for the second time.

The visual field of the left eye was contracted above and within the fixation point, and the first question to decide was whether we should perform sclerecto-iridectomy or simple sclerectomy. For a year past, a large number of simple perforating sclerectomies have been done with success; some of the patients live at Bordeaux, and we invited M. X— to see them, to "study them." Our assistant, Dr. Beauvieux, present at all our examinations of, and conversations with, M. X—, made a list of these patients and facilitated an interview between them and M. X—. One of the patients, recently operated on, came especially to the *clinique* to show himself to M. X—. The latter examined him for a very long time on several occasions, and satisfied himself as to the value of simple sclerectomy.

Sclerecto-iridectomy on the right eye had given a moderate result as regards acuity, good as regards hypertension; we explained to the patient, who belongs to the medical profession, that in these results what is bad is referable to the iridectomy, and what is good to the sclerectomy. He inclined himself to our way of thinking.

On February 22nd, before Dr. Beauvieux, in my consulting room, he agreed that on the following day, the 23rd, we were to perform simple sclerectomy, and that if the iris did not remain in place, we should make use of the peripheral buttonhole, such as Holth (of Christiania) has advised. On that day M. X— conferred for a long time with our assistant concerning simple sclerectomy, the reports of our cases were entrusted to him, he examined them with the greatest care and appeared to have thoroughly grasped the idea of touching the iris as little as possible, on account of the field of vision bordering on the fixation point, and of the very obvious nervous state which dominates the symptomatology of his affection.

February 23rd. — Before the operation we took the tension with the tonometer of Schiötz, and we found 30 mm. in the right and 60 mm. in the left; the evening before there had been no obvious hypertension on either side. The left eye was probably hypertense from the emotional influences of the subject. A very satisfactory simple sclerectomy was then performed with excision of a large piece of sclera in a good situation in the anterior lip of the wound. The pupil was a little lengthened in an upward direction, resuming its circular shape with the aid of light massage, but to avoid prolapse, we considered it a good thing to make a small peripheral buttonhole. The pupil, examined for an instant, remained quite round, the conjunctival flap, wide and thick, was replaced on the wound. The patient followed with satisfaction all the steps of the operation, performed according to the programme put forward the evening before by Dr. Beauvieux, and in the presence of Drs. Beauvieux and Bonnefon and of the Hospital staff specially attached to our service.

February 24th. — On the evening of the 23rd the patient experienced some pain in his eye, and during the night wandered, becoming even delirious, for delirium alone could be held responsible for the insane remarks addressed to those who had the care of him, and who, like ourselves, were very solicitous for his welfare. On the morning of the 24th, however, the eye was not injected: there was no prolapse, but in order to examine the eye closely, the patient was gently taken on the rubber-tyred stretcher to the operation room. There we noted that, on the whole, the pupil was round and small, the eye tense. For some hours the patient had not complained, and we did not think it necessary to intervene. After eserisation, the pain began again, so much so that we attributed it in great measure to this drug, and we replaced it on the evening of the 24th with pilocarpine.

February 25th. — The night was a very bad one. At the morning visit we noted that the eye was in a state of subacute glaucoma; cornea dull, no vision, T. 43. There was, however, no prolapse, most probably on account of the peripheral iridic buttonhole which allowed the aqueous to flow beneath the conjunctiva without raising the iris and thrusting it into the wound; the pupil is, as before, in the middle of the cornea, or very nearly so, quite round and rather small. The patient, who refused chloroform—so useful in such cases—was taken to the operation-room. The conjunctival flap was turned down on the cornea. In the distended scleral opening appeared the small iridic breach lifted up by a small dome, evidently the vitreous body. It was clear that, if iridectomy was performed, the eye ran the greatest danger and that there must follow a considerable loss of vitreous. It was necessary to choose between an equatorial puncture and one made in the scleral opening over the vitreous still held by the zonule which presented in that position. That we were perplexed for an instant, will be appreciated by every operator, but we at once came to a decision, and by a swift cut with the scissors, we increased the iridic opening. A half-drop of vitreous flowed out, and in the hope that we had thus reduced the tension, we quickly replaced the conjunctival flap on the wound, and closed the lids.

The events succeeding this interference were immediately very fortunate. From the evening of the 25th, there was no more pain. The night of the 25th to 26th was very good; the eye was eserined with eserine in oil twice daily. On the evening of the 26th we left the patient, telling him that on the morrow, being obliged to make an urgent journey to Pau, we should visit him at 6 a.m. He desired us not to do so, and I informed him of my intention of coming to see him in any case on the evening of the 27th at 11 o'clock, on the arrival of the train from Pau. But on our return home we were advised by telephone that the patient had had a very good day and that it would be useless to come to see him so late.

The 28th, the same satisfactory condition, pupil quite round, no prolapse, no inflammation, good vision. The patient particularly told us that he saw quite well our faces and spectacles when we bent over his eye.

From the 1st to the 6th March, the condition remained absolutely unaltered, pupil round, no anterior chamber, and always good vision, no prolapse or pain, the patient was examined on several

occasions in the dark room, the media of the eye were perfectly clear, no inflammation of the deep membranes. Displeased with the attack of acute glaucoma which so unfortunately assailed him, M. X— could scarcely restrain the impatience due to his nervous condition, but no one forgot that he was ill, and all treated him with the greatest kindness and consideration, although we were badly treated by him personally, of this we give a good example. We examined him carefully twice daily, explaining to him that, on the whole, he was very well recovered from his attack of subacute glaucoma and giving him all the moral comfort possible. However, very dissatisfied with everyone and everything, the patient announced his departure on the following Sunday, loudly declaring that nothing would keep him longer in our house, and he very unwisely left for a long journey, despite our advice, in the condition we described above—that is, without an anterior chamber but with no prolapse or pain, with a circular pupil, good vision, and normal tension. We have not seen him again.*

This case shows in the right eye the value of sclerectomy from which the patient had had considerable benefit; in the left it establishes the value of the peripheral buttonhole, which alone, can explain why, despite the onset of an acute glaucoma, no prolapse of the iris occurred. We would, in fact, bring to notice that the treatment applied to this severe case of acute glaucoma was particularly successful, since it so quickly subsided. It is at the least reasonable to consider that the patient would have been completely cured, had he been willing to remain long enough under our care.

The conclusion of this paragraph upon sclerectomy with peripheral iridectomy is that this operation is indicated at all times when in the course of the operation the iris does not remain in place. Performed systematically as Holth advises, is it not inconvenient? we believe not, but, if the iris remains perfectly and spontaneously in the anterior chamber, we do not see any great advantage in it. This is, however, a point for consideration, upon which I am not yet able to form an opinion. It may be that the peripheral buttonhole of Holth is always advisable, and that it is prudent to perform it in all cases. It may be that at some future date we shall be able to lay down definitely its precise indications.

(c) Sclerectomy with ordinary iridectomy.

Sclerectomy with ordinary iridectomy is indicated in all the cases where iridectomy gives good results, and in chronic glaucoma these cases are certainly numerous, 50% according to the old statistics of von Graefe, and the recent works of Truc (Montpellier). We think that this figure, 50% is too high, but we do not look for an impossible preciseness and simply mention that in all the cases where iridectomy is indicated, it would be necessary to resort to and to add sclerectomy. Among the recent works of the kind extolling sclerectomy with ordinary iridectomy we call special attention to that of Meller,¹⁰ based on numerous operations performed at the clinique of Professor Fuchs, in Vienna.

Iridectomy is the more useful according as the eye is more tense; elsewhere we have stated why. In our opinion, when the eye is tense, the scleral section heals up under pressure, and the result is an ectatic cicatrix, lax, thin, permeable, and filtrating long enough to inspire belief in a lasting cure of glaucoma. On the whole, iridectomy probably goes for little, perhaps nothing in the successful result, but in the cases of glaucoma with rather much hypertension, iridectomy should be performed for two reasons; first, that it is no trouble; secondly because it takes away, even better than does the buttonhole of Holth, the fear of prolapse after sclerectomy in a tense eye.

* We specially call the attention of our readers to this case, adding that this patient, who after the severe complication which happened to the left eye, left our hands in the condition which we described, who had considerably benefited by our intervention gratuitously given in the case of the right eye, and for whom we had shewn the greatest and most disinterested concern, has sought out and found an advocate and an attorney, in order to prosecute us in a law-suit. There is here from the point of view of the mental condition of patients and lawyers a practical lesson which deserves to be remembered by all.

If perforating sclerectomy, simple or with peripheral iridectomy, is an operation to be recommended in the cases noted above, sclerecto-iridectomy stands, in my opinion, as the operation for choice in a large number of cases, and especially in chronic glaucomas with constant hypertension, equal to or greater than + 1.

Iridectomy, by the large scleral section which it necessitates, is already a very useful intervention; by adding thereto sclerectomy, a filtrating cicatrix is obtained—lasting, even permanent: a veritable fistulisation of the eye.

Upon the value of sclerectomy with ordinary iridectomy Allen Greenwood,¹¹ of Boston, has written a very concise article in which he proves the value of the scleral section which we put forward, and in which also he shews that all the operations conceived after ours, by Herbert, Fergus, and Elliot, Verhoeff, have our operations as a basis and guide. After having made a detailed study of all the variations brought forward by our English or American colleagues, Allen Greenwood remains true to our *technique*, by the aid of which he has been able to obtain the best results.

The only author who, in our opinion, has added any improvement to our operation is Holth, for it is possible that peripheral iridectomy can, in a good number of cases, replace ordinary iridectomy: it will be our future task to try and specify the various indications of the two kinds of iridectomy. Such as it is, our experience is very favourable to sclerectomy with ordinary iridectomy. We cannot here give all the successful cases which we have got together; the reader will find them in the thesis by Dr. Beauvieux, but we here publish those which are less than a year old since we undertook this article, including one failure, the only one, however, truly imputable to the operation.

Cases XXI and XXII.—*Double chronic glaucoma. Double sclerecto-iridectomy.*

M. X.—, 63, suffering from arthritis and sclerosis, began to experience the premonitory signs of glaucoma in 1903: at that time he complained he was unable to obtain satisfactory glasses for his presbyopia. The right eye has always been more affected than the left: slow diminution of visual acuity, hypertension more marked in R.E., typical glaucomatous cupping, contraction of the field within and below. Four years ago two sclerotomies were performed on him without leading to any improvement.

In the month of August, 1908, the vision was R.E. +1.25 V. = $\frac{1}{50}$, L.E. +1.25 V. = $\frac{1}{4}$. Typical excavation of both discs, more marked in the right eye.

At this time I performed a sclerecto-iridectomy on the right eye, and some days later on the left.

Fifteen months after the double operation, we had news of the patient, from his nephew, Dr. Egana, oculist at San Sebastian. The acuity is the same on both sides. Apparently, it had increased on the right side. The tension is normal, the fistule appear to act wonderfully well. M. X.—is no longer troubled with the subjective symptoms mentioned above.

The mental condition of the patient is much improved. He is able to follow all his occupations.

Case XXIII.—*Double chronic glaucoma. Sclerecto-iridectomy L.E.*

M. X.—, 62, presents a very rheumatic diathesis in his family history; he, moreover, suffers from albuminuria (0.18 gr.) and slight glycosuria. Twelve years ago, the patient lost in one year the left eye on account of chronic glaucoma. Towards May, 1907, M. X.—began to experience the same phenomena in the left eye: slow and gradual loss of vision (dimness, coloured rings, etc.). Five months ago, after a carriage accident, the progress of the affection was hastened. He came to see us in July, 1908, and we observed all the signs of chronic glaucoma with constant hypertension, T. +1 (full), manifest cupping of the disc, L.E. V. = $\frac{1}{2}$. This acuity was taken after 5 days' treatment by eserine. The field measures 20° within, 10° above and below, 80° without. The colour sense is maintained. I performed sclerecto-iridectomy by the ordinary method. Subsequent events excellent.

Aug. 12th, 1908. The condition is as follows:—L.E. 90°—1—3 V. = $\frac{1}{4}$. There is therefore a considerable increase in the visual acuity. The field is the same; the tension is normal.

M. X.— was seen again in December, 1909, some 18 months after the operation. The tension of the left eye is normal, there exists a very obvious fistula in the shape of a small black point surmounted by a well-marked conjunctival ampulla. The acuity has further increased. L.E. 90°—1—2 V. = $\frac{1}{2}$. The field is unaltered. The patient is able to read, and to follow, to his great satisfaction, all his occupations.

Case XXIV.—*Double chronic glaucoma. Sclerectomy after iridectomy L.E.*

M. Th.—, 60, was sent us by Dr. Aubineau. A very nervous, emotional, and overworked patient.

On May 22nd, 1905, Dr. Aubineau noted:—R.E. Absolute and painful glaucoma, notwithstanding a double iridectomy above and below performed by a colleague. L.E. V. = 1, but symptoms of

glaucoma, contraction of the field internally, cupping already marked. No inflammatory signs. In the month of June, intolerable pain necessitating enucleation of the right eye. Histological examination revealed the lesions typical of absolute glaucoma.

January 14th, 1907.—The patient has discontinued pilocarpine for a long time. L.E. $V = \frac{1}{4}$. This acuity gradually lessened, and on January 6th, 1908, was $\frac{1}{5}$. The field measures 50° without and below, 20° above and within. Dr. Aubineau performed iridectomy, following which there was a sudden lowering of vision, the patient counted fingers at 30 cm. In the month of March, 1909, the eye was hard and the field gone above and below. There was an evident paracentral scotoma. Very marked cupping of the disc. In July, 1909, we noted the same condition. On account of the nervousness of the patient, sclerectomy was performed under chloroform without incident. Ten days later, he left the private hospital in a relatively satisfactory condition.

In September, 1909, Dr. Aubineau sent us the following notes:—"The sclerectomy you performed has made an undoubted improvement, characterised *objectively* by (1) a permanent diminution of the ocular tension, which is maintained at normal without the aid of myotics, (2) by a diminution in the depth of the excavation; *subjectively* by (1) an increase in the vision, due particularly to the improvement in the field (3° within, 45° above and without, 60° down and out, 60° down). The patient is, indeed, delighted with the operation, and I myself very pleased that he decided to have it."

More than a year after the intervention, the improvement is maintained at the same.

Case XXV.—Double chronic glaucoma. Sclerecto-iridectomy, L.E.

M. X—, aged 50, no personal or family antecedents worthy of mention. In the month of January, he had in the right eye an attack of subacute glaucoma, which was treated by eserine, the attack quieting down after three days. For three months following this the vision imperceptibly diminished. An operation (?) was performed, but despite it, the acuity became *nil* in some months. In the month of October, 1908, the left eye showed the same phenomena, which were put down to sympathetic ophthalmia; enucleation of the right eye. Notwithstanding this, the vision of the left eye perceptibly diminished and the tension increased ($T. + 1$), mistiness, coloured circles, fogs, etc.

On February 5th, 1909, L.E. had a tension of $+ 1$, pupil dilated, and there was an inferior synechia. Acuity equalled $\frac{1}{4}$; the field, very contracted, measured 18° within, 20° above and below, 30° without. The colour sense was good, and there was a very definite glaucomatous excavation.

On February 6th, I performed sclerecto-iridectomy. The subsequent events were excellent, so much so that on the 13th, the anterior chamber was re-formed and the tension normal. $V. = \frac{1}{4}$, $90^\circ - 0.75$ $3 V. = \frac{1}{4}$. The field was increased in a very noteworthy manner (45° above, 35° below and within, 70° without). The patient was delighted with the result.

M. X—, seen again more than a year after the operation, shows the same improvement as before. There is no hypertension, the acuity equals $\frac{1}{4}$, the field is considerably enlarged. He shows a very visible fistulette, with slight ampulliform swelling of the conjunctiva.

Case XXVI.—Double chronic glaucoma. Sclerecto-iridectomy L.E.

M. X—, age 70, has a cardiac and very marked nervous history. Very much taken up with his own condition; he is despondent, neurasthenic, frequently suffering from obstinate headache. He began to lose the sight of the right eye three years ago, over the space of five or six months. No pain, some periorbital heaviness, never any inflammation.

Very marked coloured rings. Enormous cupping of the disc. $T. + 1$. Vision completely abolished.

In the left, the same signs began to show themselves about two years ago, sensations of fogs which considerably disturbed the vision, coloured circles, etc. Papillary cupping very obvious. $T. + 1$. With -2 acuity equals $\frac{1}{4}$. The field very contracted, measures 5° within and below, 28° above, 30° without. Colour sense maintained. This patient had been for some time treated by myotics without result.

On the 15th June, 1909, I performed sclerecto-iridectomy on the left eye. The cicatrix was perfectly established, and on the 30th July the tension was normal, the wound covered with an obvious conjunctival ampulla. In return, the acuity was $\frac{1}{4}$ with $55^\circ - 3 - 3$, i.e., a rather marked diminution. The field remained the same. The nervous condition of the patient increased, he was very depressed, depondent, and scarcely answered questions put to him, threatening to put an end to his sufferings, etc.

M. X— was seen on different occasions, notably on the 14th September and the 16th December. The fistulous cicatrix appeared to act very well there are three or four small openings in the length of the incision with slight conjunctival swelling. The vision remains at $\frac{1}{4}$. The mental condition of the patient is deplorable. Seen again in June, 1910, a year later, the acuity is less than $\frac{1}{4}$ with $60^\circ - 3 - 3$. However, the hypertension has disappeared and the fistula has the same appearance as in September. The papillary excavation appears to have lessened: the field is the same. M. X— is still further depressed.

Résumé.

Analysing the above cases and previously published ones, we note the following results:—

1. Simple perforating sclerectomy, 16 cases—15 successes, 1 failure.
2. Sclerectomy with peripheral iridectomy, 4 cases—3 successes, 1 failure.
3. Sclerectomy with ordinary iridectomy, 47 cases—43 successes, 1 failure,

3 others with diminished vision due to the appearance of cataract some time after the operation.

Three cases only have been really unsuccessful by reason of the complications which were associated with them. They comprise in themselves an extremely important lesson, by reason of their occurrence in subjects in whom neurosis played a wholly preponderating rôle. The intraocular hypertension in these three cases was very variable according to the moment, the eye passing from normal tension to one of $+2$ with extraordinary case under the influence of emotion. Thus, the patient in Case XX, with normal tension on the evening before, had T. $+2$ in each eye on the operation table on October 13th, 1909; similarly in Case XXVI. We had decided to perform simple perforating sclerectomy, but, at the time of operation, the eye had increased tension, and after the scleral section, the iris came with force into the wound. It became necessary to perform sclerecto-iridectomy, the result of which was not successful.

The patient in Case VII, again, is an arthritic with an extremely neurotic temperament. He is subject to vertigo, almost syncope; however, in his case we never noted these rapid changes in the tension of the eye; his "nervous" condition is less marked than that of the other two, where truly it assumes an importance of the first order.

These hyperneurotic subjects are specially formidable. The act of operation, whatever it may be, may entail in them the most unfortunate complications, inhibition of the retinal functions bringing the field of vision to the point of fixation, congestion of the vessels even to the point of rupture, œdema of the whole globe—that is to say, sub-acute glaucoma. All these accidents have, as a cause, the neurotic condition of the subject, and in this article, where we can do no more than give an outline of the indications for perforating sclerectomy: (1) without iridectomy, (2) with peripheral iridectomy, and (3) with ordinary iridectomy, we feel it our duty to point out that as regards the grave operative complications, these three varieties of sclerectomy for glaucoma offer the same dangers, and that they are specially to be feared in subjects in whom neurosis dominates the scene.

If one considers the number of sclerectomies which we have performed for chronic glaucoma, we might well point out that three unsuccessful cases form a truly low figure, and that the *ensemble* of results obtained by our new method of treatment of glaucoma still remains extremely favourable. The three failures which we record should not make one forget the number of successes which we have brought forward in this communication or elsewhere, notably in Dr. Beauvieux's thesis; whilst remembering the fortunate ones, however, it is fitting to consider at length and attentively the unfortunate ones in the hope of discovering their cause, and to lay down more and more clearly the indications and contra-indications for surgical interference in chronic glaucoma. Fully to understand, in this disease, the indications of (1) simple perforating sclerectomy, (2) with peripheral buttonhole, (3) with ordinary iridectomy, we must never lose sight of the fact that the state of the tension is not the only sign which should guide us. Without hesitation, I adhere to the division I have brought forward between chronic glaucoma with intermittent hypertension and with constant hypertension: but, by the side of this division according to tension, it is meet to place another according to the pathogeny and ætiology. From this point of view, glaucomas are of *vascular* origin (angio-sclerosis) of "nervous origin" (excitation of the sympathetic), and between these two glaucomas, vascular glaucoma and nervous glaucoma, one must place "vasculo-nervous" glaucomas, in which the two ætiological factors go hand in hand.

We have thus chronic glaucoma with constant hypertension, and with intermittent hypertension, and these may be by origin, vascular, nervous, or vasculo-nervous. Which case requires which kind of operation—simple perforating sclerectomy, sclerectomy with partial iridectomy, or sclerectomy with ordinary iridectomy?

In conclusion, we can reach some exactitude and say:—

Glaucoma with constant hypertension is most often vascular or vasculo-nervous, glaucoma with intermittent and varying hypertension is a nervous glaucoma. The first are under the jurisdiction of sclerecto-iridectomy or sclerectomy with peripheral iridectomy, the second point especially to simple perforating sclerectomy. Among the latter, some require the "buttonhole of Holth." They are those in which, in the course of the operation, the iris will not remain exactly in place but threatens to prolapse.

We repeat, however—and this is our last word—that before operating for chronic glaucoma, the surgeon must have only a provisional plan, which he will modify in the course of the operation according to events. He will always perform a sclerectomy, which should remain the basis of all methods, and will add thereto, according as a greater or less tendency to prolapse occurs, a peripheral iridectomy or an ordinary iridectomy.

BERNARD CRIDLAND.

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CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—VISUAL PHENOMENA CONNECTED WITH THE
YELLOW SPOT.

Edridge-Green, F. W.—Visual phenomena connected with the yellow spot. *Journal of Physiology*, November 9th, 1910.

These experiments were made by Edridge-Green, of London, on the assumption that the visual purple is the visual substance, and that the cones of the retina are not directly sensitive to light, but only to chemical changes in the visual purple, which is diffused into the layer of liquid surrounding the free ends of the cones. The author describes various experiments, in some of which the macular region is seen as a dark spot on a light ground, and others in which it is seen as a spot much brighter than the ground. Figure 1 shows a sector of one of the subjective appearances seen by the author in the morning on awaking. The centre has a spotted appearance, the circles being larger at the periphery with gradually increasing black intervals. Outside the macular region the spots of light are further apart and less defined. This corresponds to the cone distribution of the retina, the black portions corresponding to the portion of the retina occupied by rods.

Currents seen in the field of vision not due to the circulation.

1. Currents seen with one eye partially covered.—If one eye be partially covered with an opaque disc whilst both eyes are directed forwards in a not

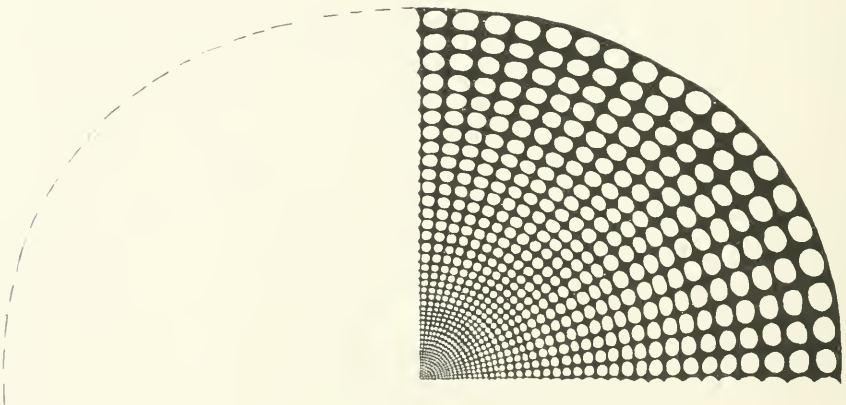


FIG. 1.

too brightly illuminated room, and special attention be paid to the covered eye, an appearance of whirling currents will be seen with this eye. See Fig. 2. These currents appear to be directed towards the centre, and have a very similar appearance to a whirlpool. On closing both eyes, all the portion in which the whirling currents are seen appears as dull purple. These

currents cannot be due to vessels, because we know that the centre of the retina, corresponding to the point where the greatest movement is seen, is free from vessels. The appearance is also very different from that of the movement of blood in vessels. The experiment succeeds best if the eyes have been previously exposed to a fairly bright light. An opaque disc in a spectacle frame suffices admirably, a certain amount of light being allowed to enter the eye from the periphery.

2. **Currents seen in the light with one or both eyes open.**—It is easy to see the currents at almost any time on regarding fixedly a not too brightly illuminated surface. I find that it is better to use only one eye, but they can be seen with both eyes open. The first appearance which is always visible to me is a star-shaped figure corresponding to the region of the fovea. There appears to be rapid circular movement behind this star, that is, the movement appears to be further off in the field of vision, like a top spinning or a catherine wheel, the rays of the star remaining always visible and stationary. The field of vision then becomes dark, and the movement spreads until it covers the whole region corresponding to the yellow spot, and the currents in this outer portion form a network with wide meshes (Fig. 2). The currents seem to proceed from four main places of entry—two horizontal and two vertical. The movement is at first slow, and then gets more and more rapid, especially in the centre.

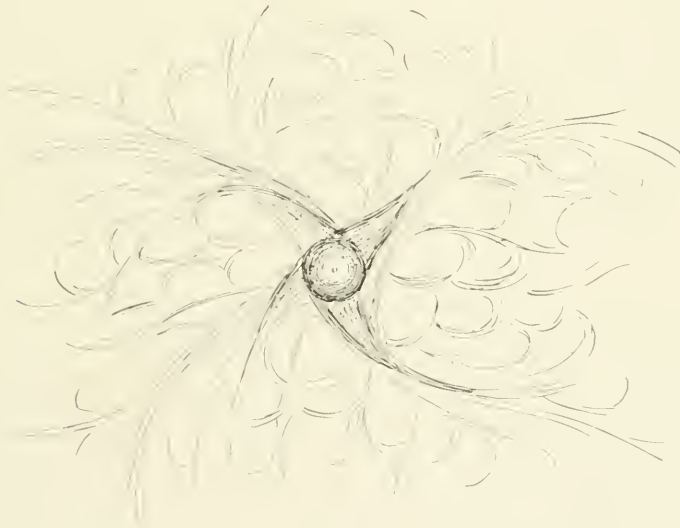


FIG. 2.

3. **Currents seen in the dark.** Currents can be seen in the dark which correspond in their general character to those seen in the light. The whirling in the centre is generally very noticeable. Generally, pale bluish-violet circles form in the periphery, and these gradually contract and advance on the centre of the field of vision. When the circle reaches the centre, it breaks up into a star-shaped figure and becomes much brighter. This is then succeeded by another contracting circle.

4. **Currents seen through yellow-green glass.**—I see these currents with yellow-green glass, when the eye has become fatigued by looking through the glass, the whole field becomes dark, and the whirling currents are seen. The general form remains the same. The position of the currents in the outer part of the field of vision seems to change continually.

5. **Currents seen with intermittent light.**—If, when regarding a rotating disc composed of black and white sectors, we note the time when the fine flicker is most marked, and keep the eyes steadily fixed on the disc, the field of vision often becomes dark-red, and we see a number of interlacing currents forming the figure, shown in Fig. 2.

6. **Sudden cessation of currents.**—The currents are usually very evanescent, but I have seen them at times continuously for several seconds. Occasionally, they will all stop at once, and three-cornered spots with rounded ends are seen at the junctions of the currents. These currents, whilst preserving the same general form, seem to change their path continually. External objects are not visible in the portion of the field of vision in which the currents are seen.

7. **Effect of the currents on an after-image.**—The currents carry the visual quality, colour, and brightness of the region from whence they come into the after-image. They also tend to move the after-image towards the centre; thus, if we have two similar after-images, one situated in the centre and the other a short distance from the centre, the one external to the centre may be carried into the centre and combine with the one already there.

The way in which the currents encroach on an after-image may be seen in the following way.—One eye being shut and covered up, the other is directed to the bright blue sky, whilst the open fingers are moved rapidly before it. On shutting the eye and covering both, the yellow spot region is marked out as a rose-coloured oval. There is a sensation of rapid and whirling movement on the outside of the oval. As the movement encroaches on the rose oval, this disappears from without inwards, the last movement to be seen being the whirlpool movement, like a top spinning in the centre.

8. **Effect of movement of the eyes on the currents.**—The currents, especially the broad ones, which are found in the outer part of the field of vision, are affected by movements of the eyes.

Interpretation of the phenomena.

On the theory he has put forward* Edridge-Green explains these phenomena in the following way.—The currents seen are currents of visual purple flowing into the external fovea. When there is visual purple in the fovea, this is the most sensitive part of the whole retina, but when there is none there, time must elapse before it can diffuse into the spot.

Edridge-Green has three specimens prepared by C. Devereux Marshall showing the retinas of monkeys from the outer side and the arrangement of the rods and cones. The appearance of the cones of the fovea is exactly the same as the entoptic appearance of this central portion. The cones appeared as circles arranged in lines nearly at right angles to each other with a slight curve towards the centre of the fovea. He found the same with a human fovea, only the cones were smaller than in the case of the monkey. On examining the external surface of the retina of a monkey, there appeared four slight depressions leading to the larger depression of the external fovea. These depressions corresponded to the four main branches seen in the subjective phenomena, and would appear to be channels to allow of the easy flow of the visual purple. It occurred to the author that if this were the case we should obtain evidence of them in the cases where the outflow from the retina was obstructed, as by tumour. He finds that this is the case, the

*Colour Blindness and Colour Perception, p. 312.

star-shaped figure given by Sir Victor Horsley in his paper on tumour of the frontal lobe* is almost exactly the same as that seen subjectively.

The web-like appearance seen subjectively corresponds to the cone distribution of the retina as viewed from its outer side, the portions occupied by rods appearing as dark spaces.

The yellow pigment in the yellow spot, on the theory the author has given, should have a similar function to the yellow screen in photography.

AUTHOR'S ABSTRACT.

II.—TELESCOPIC SPECTACLES.

Hertel, E.—On a substitute for the operative correction in high myopia by so-called telescopic spectacles. Graefe's *Archiv für Ophth.*, Bd. LXXV, Heft 3, S. 586, June, 1910.

Full correction of myopia is generally adopted, because statistics have proved that it is less progressive in those who receive full correction of the error than in those with "under-correction" or none at all. Therefore, full correction, to enable the best vision at the distance, and a glass for near-work proper for the patient's occupation. Full correction in cases above 8 D. is often not sufficient to obtain full vision; above — 15 D. very rarely so. Compare the statistics of Leininger, Schleich, Schlesinger, Seggel, quoted by Hertel, in Graefe's *Arch. f. Ophth.*, Bd. LVI, Heft 2, S. 326.

Hertel, of Jena, has found that the vision diminishes with the increase of the myopia: $V.=1$ only up to 9—11 D.; $V.=1/2$ rare above 9—11 D.; $V.=1/4$ the rule above 10 D. Causes:—(a) fundus complications, which increase in proportion to the number of dioptries; (b) changes through stretching of retina and choroid.

Operation produced an average increase of vision of 1.5 times, although the changes in the fundus remained unaltered; therefore, the causes above mentioned cannot be the only ones. It was thought that the retinal images became larger by correction after the operation. The size of the image in a myopic eye, corrected with a concave glass 15.7 mm. in front of the vertex of the cornea, equals that of the emmetropic eye. Usually, the correction is placed only 12 mm. in front of the corneal vertex—that is, within the distance of the anterior focus, or less than 15.7 mm.

Hertel computes that the image obtained after the operation is 1.30 times larger than that obtained by correction with concave glasses.

In near vision the myope will approach the objects closely to the eye in an attempt to gain larger images. Very often, however, this is not comfortable, owing to greater accommodative efforts. The images are closer to the eye than the objects in proportion to the strength of the concave glasses. This and also the fact that increased innervation of the accommodation cause an unduly increased innervation of convergence, explain why full correction is not comfortable to the myope when doing close work. These persons prefer to read without a glass, because they thus obtain larger retinal images and a better angle of distinction. But they are

**British Medical Journal*, 1910, p. 556.

exposed to two dangers: they may lose their binocular vision or increase their myopia by complications arising from too close an approximation of the objects. The operation will safeguard against the latter danger.

Hertel, in choosing an example of a patient with 20 D. refraction (with glasses) and an accommodation of 1 D. while reading without a glass, and then with -16 D., states that the person will obtain without a glass an image three times larger than when reading with -16 D., under the condition that he approaches his objects so as to obtain the same accommodation.

The shortening of the focal distances due to accommodation need not be considered, since it amounts to merely a few tenths of a millimeter.

Another formula demonstrates that a myopic person of -20 D. obtains for reading without a glass retinal images twice as large as those of the same person wearing about $+5.0$ D. after the operation.

These rules are valid only for the vision of the unmoved eye.

Through the motion of the eyes during vision other disadvantages of correction with glasses are to be considered:—(1) The usually worn biconcave glasses do not allow correction of astigmatism of oblique bundles. In consequence of this, the field becomes so ill-defined at a small distance from the centre of the glass that it cannot be used for distinct vision. (2) The field of vision will assume a "barrel shaped" distortion towards the margin of the glass. This is of especial importance. See fig. 1, which is taken with a -20 D. glass (biconcave) and shows the picture of a landscape obtained in the focal plane. Only the small central portion is well defined, and the periphery is distorted, *e.g.*, the chimney.

Hertel holds that this distortion is responsible for the inability of most patients to wear strong concaves. Apparent elevations and undulating motions may cause dizziness, headache, and malaise.

The operation will eliminate astigmatism of oblique rays and distortion if emmetropia is obtained, and will reduce these two disadvantages in patients who have to wear glasses so greatly that they need not be considered. The operative correction is preferred therefore, especially since Fukala showed its value, notwithstanding the fact that Donders, v. Graefe, and others were opposed to it. Other factors, however, endanger the success: infection, technical factors, secondary glaucoma, decreased tension and hæmorrhage, dangers through existing liquifaction of the vitreous, detachment of the retina. At present, after an experience of about twenty years, the operation is generally considered dangerous, and justified only in a limited number of cases, most of all in those where correction with glasses cannot be obtained.

Moreover, the consideration of binocular vision, the degree of the myopia, the age of the patients, and the existing complications will limit the result of the operation to such an extent that a substitute seems desirable.

The images of objects may be enlarged by telescopes or "Steinheil's Conus," considered by Donders and others as the only means to enable a myopic person to see well at a distance. The reduced field of vision, the weight, and clumsiness of the glasses, however, limited their usefulness. A much more perfect instrument is the "*Fernrohrbrille*" or "Telescopic spectacles," consisting of a combination of a convex objective with a concave ocular similar to the so-called "Dutch telescopes." It has to be fitted to each individual case with special consideration of the turning point of the eye and the attempt to get as large a field as possible. Hertel adopted a combination of lenses magnifying the images about 1.5 times. Trials yielded an increase of the vision amounting to from 0.3 to 0.5 of the normal.

451

TO ILLUSTRATE
TELESCOPIC SPECTACLES.

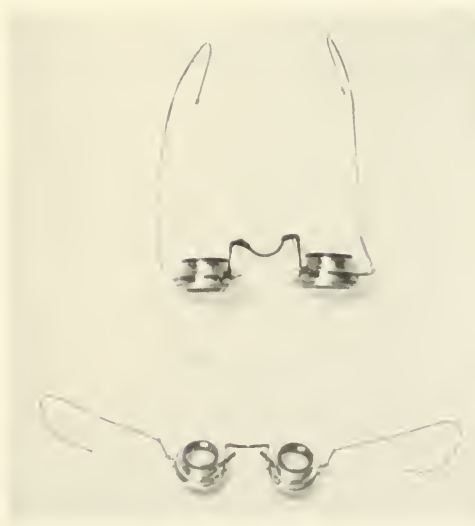


Fig. IV

Results of examination with telescopic spectacles enlarging 1.5 times:

No.	Name.	Age.	Glass refraction.	Sight with concave gl.	Sight with telescopic spectacles 1·5 times.	
					Distance.	Near.
1	Klaus	31 years	$\left\{ \begin{array}{l} R-20D \\ L-20D \end{array} \right.$	$\begin{array}{l} 5/15 \\ 5/15 \text{ nearly} \end{array}$	$\left. \begin{array}{l} 5/7\cdot5-5/5 \\ 5/7\cdot5 \end{array} \right\}$	$\left. \begin{array}{l} 0\cdot48 \\ 0\cdot5 \end{array} \right\}$
2	Taubeneck	41 "	R-20D	5/20	5/10	$\left. \begin{array}{l} 0\cdot3 \\ 0\cdot6 \end{array} \right\}$
3	Hundertmark	20 "	R-14D	5/20 nearly	5/10	$\left. \begin{array}{l} 0\cdot3 \\ 0\cdot6 \end{array} \right\}$
4	Finn	36 "	$\left\{ \begin{array}{l} R-25D \\ L-25D \end{array} \right.$	$\begin{array}{l} 5/35 \\ 5/25 \end{array}$	$\begin{array}{l} 5/20 \\ 5/20 \end{array}$	$\left. \begin{array}{l} \left\{ \begin{array}{l} 0\cdot28 \\ 0\cdot9 \end{array} \right\} \\ \left\{ \begin{array}{l} 0\cdot28 \\ 0\cdot8 \end{array} \right\} \end{array} \right\}$
5	Meissner	27 "	$\left\{ \begin{array}{l} R-10D \\ L-11D \end{array} \right.$	$\begin{array}{l} 5/5 \\ 5/7\cdot5 \end{array}$	$\begin{array}{l} 5/4 \text{ nearly} \\ 5/5 \end{array}$	$\left. \begin{array}{l} 0\cdot38 \\ 0\cdot4 \end{array} \right\}$
6	Patzer	10 "	$\left\{ \begin{array}{l} R-7 \\ L-7 \end{array} \right.$	$\begin{array}{l} 5/15 \text{ nearly} \\ 5/10 \end{array}$	$\begin{array}{l} 5/7\cdot5 \\ 5/7\cdot5 \end{array}$	$\left. \begin{array}{l} 0\cdot2 \\ 0\cdot4 \end{array} \right\}$
7	Proschner	28 "	$\left\{ \begin{array}{l} R-14 \\ L-12 \end{array} \right.$	$\begin{array}{l} 5/35 \\ 5/15 \end{array}$	$\begin{array}{l} 5/15 \\ 5/10 \end{array}$	$\left. \begin{array}{l} \left\{ \begin{array}{l} 0\cdot3 \\ 0\cdot75 \end{array} \right\} \\ \left\{ \begin{array}{l} 0\cdot3 \\ 0\cdot6 \end{array} \right\} \end{array} \right\}$
8	B. Bross	14 "	$\left\{ \begin{array}{l} R-12 \\ L-13 \end{array} \right.$	$\begin{array}{l} 5/15-5/10 \\ 5/15 \end{array}$	$\begin{array}{l} 5/7\cdot5 \\ 5/10-5/7\cdot5 \end{array}$	$\left. \begin{array}{l} 0\cdot3 \\ 0\cdot6 \end{array} \right\}$
9	W. Bross	18 "	R-10	5/20-5/15	5/15-5/10	$\left. \begin{array}{l} 0\cdot28 \\ 0\cdot6 \end{array} \right\}$
10	Hildebrand	16 "	$\left\{ \begin{array}{l} R-20 \\ L-20 \end{array} \right.$	$\begin{array}{l} 5/20 \\ 5/20 \end{array}$	$\left. \begin{array}{l} 5/10 \text{ nearly} \\ 5/15 \end{array} \right\}$	$\left. \begin{array}{l} 0\cdot3 \\ 0\cdot6 \end{array} \right\}$
11	Eckert	26 "	$\left\{ \begin{array}{l} R-16 \\ L-18 \end{array} \right.$	$\begin{array}{l} 5/20 \\ 5/20 \end{array}$	$\left. \begin{array}{l} 5/10 \\ 5/10 \end{array} \right\}$	$\left. \begin{array}{l} 0\cdot27 \\ 0\cdot5 \end{array} \right\}$
12	Meyer	30 "	$\left\{ \begin{array}{l} R-10 \\ L-11 \end{array} \right.$	$\begin{array}{l} 5/20 \\ 5/25 \end{array}$	$\begin{array}{l} 5/15 \\ 5/15 \end{array}$	$\left. \begin{array}{l} 0\cdot3 \\ 0\cdot6 \end{array} \right\}$
13	Gebhard	24 "	R + L-10	5/7·5	5/5	$\left. \begin{array}{l} 0\cdot42 \\ 0\cdot4 \end{array} \right\}$
14	Hittig	8 "	R + L-10	5/20-5/15	5/7·5	$\left. \begin{array}{l} 0\cdot35 \\ 0\cdot5 \end{array} \right\}$

After the usefulness of the method itself had been demonstrated, the question arose whether an enlargement of 1·5 was the best, or if further increase would increase likewise the vision obtained with 1·5. Enlargements of less than 1·5 were also tried, because the vision had increased more than had been expected by 1·5 enlargements. The result of stronger enlargements was not satisfactory, because with the enlargement of the image *was* connected a certain decrease of the visual field. This may be seen on comparing the figures 2 and 3 with figure 1. Figure 2 is taken with enlargement 1·27, figure 3 with 1·63, figure 1 with the — 20 D. biconcave. Compare, *e.g.*, the houses, chimneys, windows. The only disadvantage is the diminution of the visual field which may be observed in the pictures. It is, however, smaller than may seem at first glance, since the peripheral zone of No. 1 is distorted and not sharp, wherefore it is of no use for distinct vision. The picture of the "Telespecs," on the other hand, are sharp even in their most peripheral zone. The visual field, in consequence, is almost the same in figures 1 and 2. That no distortion is present in No. 2 may be noticed upon looking at details.

How do the patients take to the new "Telespecs?" The following method of examination was employed.—The patient was advised to walk towards the "Snellen's hooks" from a distance at which he could not recognize them until he was close enough to see them distinctly. The hooks were hung up in various positions, so as entirely to eliminate the aid of memory. The light was always the same, and the examination took place each time after an equal adaptation to light, lasting half an hour. The patient—a very intelligent man—was examined with enlargements of 1·27, 1·48, 1·68, and 2·0. Results:—

Visual distance with concave specs of —20 D.	Visual distance with Telespecs —20 D.	Increase of vision.	Enlargement of the Telespec as compared with concave spec.
3·15 M	3·95 M	1·25	1·27 : 1·07 = 1·19
3·18	4·45	1·4	1·48 1·07 = 1·38
3·14	5·20	1·63	1·68 1·07 = 1·6
3·15	5·80	1·84	2·0 1·07 = 1·87

Examination of the visual field:

It was taken only in the horizontal meridian, employing a large goniometer of 5 m. radius, the centre of which the patient had to look at with his head fixed. After this the types (Snellen's hooks) were removed to a point, where the patient, still keeping his head steady, but merely moving his eyes sideways, could not see them distinctly any longer. Results:

Extent of the visual field.				For a line of print read at a distance of 30 cm.		
With concave specs	...	— 20 D.		42°	...	32 cm.
" Telespec	...	— 20 D. 1·27 times		28°	...	18 cm.
" "	...	— 20 1·48 "		24°	...	15 cm.
" "	...	— 20 1·68 "		21°	...	12 cm.
" "	...	— 20 2·0 "		18·5°	...	10 cm.

The examinations show the increase of the vision obtained with all of the "Telespecs" used, in a manner corresponding to the enlargement. The

results of this examination were more satisfactory as to vision than those demonstrated on the first table, owing to the greater accuracy of the method and the types employed. The same factor may also explain why in some operative cases the vision was better than had been expected before the operation.

The patient, who tried the different strength of enlargements for several days, selected for steady use the weakest of 1.27, because "he could see things exceedingly well and the field was agreeably large."

With the 1.27 power, the patients became accustomed to the enlargement and overcame the disturbance of orientation caused by it within a few days. They never complained of vertigo or apparent motion of the objects, although they were questioned on these points. All of them praised the advantage of the "Telespecs" in comparison with their old concave spectacles. One lady, who took a long journey with a "Telespec," declared that she enjoyed the distant view for the first time in her life. Generally speaking, it seemed that the patients noticed the advantage still more upon looking at a landscape than when examined with the test-types.

Forming an idea based upon all the examinations, Hertel draws the conclusion that "Telespecs" of 1.25 to 1.3 power should be generally used in high myopia. In some cases, especially where the vision is poor, higher powers may be preferred. One patient with -10 D., for instance, who did not derive much benefit of a 1.27 power, on account of extensive changes of the fundus, was given 1.7 power. His vision increased to such an extent as to enable him to follow his occupation of supervising architect. The disadvantage of a narrower field was equalized by the increase of his vision. Vision at a close range was rendered more difficult with the use of "Telespecs" the higher the myopia, the greater the enlargement, and the older the patients. The closer the objects are to the objective, the farther they seem to move away. The stronger the refractive power, the more divergent the rays emanating from the negative ocular will be rendered. Young people will be more apt to overcome a moderate increase of divergence. In very high degrees of myopia and high-power enlargement, the divergence cannot be overcome by accommodation.

Difficulties arising in near-work may be eliminated by a convex lens placed in front of the "Telespec," which will enable the patient to work at a desired distance, assisted at the same time by what is left of his accommodation. The figures appearing for near-work on the first table are obtained in this manner.

For near-work a "Telespec" of 1.5 to 2.0 power may be used, since here vision is limited to a narrow field anyhow. With 1.5 the field would still be 24 degrees and the patient would be able to see a line of 15 cm. distinctly at a distance of 30 cm. This would mean another advantage, because in increasing the reading distance asthenopic disturbances would be rendered less frequent and less troublesome. Also small degrees of insufficiency of the internal recti will be more readily overcome—that is, binocular vision will be facilitated. Similar results can never be obtained by the operative correction.

"Telespecs" (Fig. 4) remind one of automobile goggles, but are less conspicuous. The public will readily get accustomed to their appearance as soon as their value becomes known. The weight with glasses for both eyes is 36 grammes—that is, 8 grammes more than old-fashioned cataract spectacles. Therefore a wide nose-piece, well adapted to the saddle of the nose, is provided.

To get a properly fitting "Telespec," the following requirements must be fulfilled:

(1) Exact correction of the myopia. The posterior vertex of the lenses used for examination must be 12 mm. in front of the vertex of the cornea.

(2) It must be mentioned whether a biconcave, plano-concave, or periscopic glass has been used for the examination.

(3) Mention whether the "Telespecs" are intended for distance or near-work at a certain distance and for a special occupation. It is necessary to mention the distance of the objects and the accommodation which the patient uses for his particular work.

(4) Name occupation, if amount of enlargement cannot be expressed in figures.

(5) As to frame, mention pupillary distance and measures of the nasal bridge. An old and well-fitting frame may be sent.

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III.—BACTERIOLOGY.

(1) Bietti, A.—Marginal ulcer of the cornea due to zur Nedden's bacillus. (*L'ulcera marginale della cornea da bacillo di zur Nedden.*) *Annali di Ottalmologia*, Vol. XXXVIII, fasc. 11-12, p. 817.

(2) Pignatari, R.—Upon a form of conjunctivitis due to the micrococcus catarrhalis. (*Della congiuntivite de micrococco catarrale.*) *Ibidem*, Vol. XXXIX, fasc. 1-2, p. 121.

(3) Marongiu, L.—Upon some characters of the Morax-Axenfeld diplobacillus having a taxinomic significance. (*Su alcuni caratteri del diplobacillo di Morax-Axenfeld aventi significato tassonomico.*) *Ibidem*, Vol. XXXIX, fasc. 5-6, p. 377.

(4) Feruglio, A.—Upon a benignant form of keratomycosis aspergillina. (*Sopra una forma benigna di Cheratomicosi aspergillina.*) *Ibidem*, Vol. XXXIX, fasc. 5-6, p. 381.

(5) Bietti, A.—The pathogenic importance of the staphylococcus albus non-liquefaciens in post-operative infections of the eye. (*Sull'importanza patogena degli stafilococchi albi non liquefacenti nelli infezioni postoperatorie dell'occhio.*) *Ibidem*, Vol. XXXIX, fasc. 5-6, p. 397.

(1) The marginal corneal ulcer of special form, which corresponds with zur Nedden's bacillus, is rare, at all events, from the point of view of complete bacteriological proof, *lege artis*. Bietti's case, observed at Padua, gives that writer an occasion to review admirably the nosology and the microbiology of the disease.

A. ANTONELLI.

(2) Pignatari, of Parma, reviews the biological characters of the micrococcus catarrhalis, so well studied by Axenfeld, as regards ocular pathology, recalls the clinical and the differential characters of the conjunctivitis due to

that microbe, reports eight cases where he has found it, and, lastly, gives an account of cultures and inoculations in rabbits and in man. The very frequent existence of this micrococcus in the nasal chambers being granted, both in the normal state and also in many trivial cases of catarrhal rhinitis, it may be believed that often slight inflammations of the conjunctiva, evolving in about ten days, without complications, and recovering even without the interference of the ophthalmic surgeon, may be caused by the microbe in question.

A. ANTONELLI.

(3) The presence of metachromatic granules (shown by Neisser's method), the tendency of the microbe to metamorphism (filaments and massed elements), and the property of acidifying bouillon, are the characters of the *Morax-Axenfeld* diplobacillus, which, according to **Marongiu**, of Cagliari, enables these micro-organisms to be catalogued among the corynebacteria of Lehmann and Neumann, always bearing in mind the other characters whereby they are differentiated from *Corynebacterium Mallei*, *C. pseudodiphtheriticum*, and from *C. xerosis*. It is probable that the diplobacillus of Petit and zur Nedden's bacillus belong to the same group.

A. ANTONELLI.

(4) After having reviewed the nosography of keratomycosis aspergillina, **Feruglio**, of Siena, reports a personal case, the essential details of which may be given as follows: a peasant, aged 34 years, was wounded in the left eye with a fragment of wood soiled with earth. At the end of five days, almost without inflammatory reaction, a small corneal opacity made its appearance a few millimeters from the limbus. On examination, one saw a couple of grey nodules, a little elevated, surrounded by a zone of infiltration, with a clear trench of demarcation. A pencil of vessels advanced from the limbus to the neighbourhood of the *foyer*. The nodules were readily removed by means of a platinum wire for microscopical and bacteriological examination. Cultures showed the aspergillus fumigatus, without spores, probably because the affection was of recent date. The patient was almost well at the end of four days.

The benign form of keratomycosis aspergillina, as described in Feruglio's communication, has been found in five of the twenty-one cases of the disease published up to now. These forms, not being accompanied by serious subjective troubles, and easily curable by cleansing of the diseased focus, may readily escape observation. On the other hand, they may be mistaken for fascicular keratitis, although the aspect of the lesion, its yellowish colouration, and the presence of the furrow of demarcation and the zone of infiltration, together with the facility with which the *foyer* may be detached, should suffice to avoid the error. With regard to the *commemoratifs*, traumatism is always present, since the aspergillus does not readily adhere to the cornea. A veritable sub-epithelial implantation is necessary before the organism is able to produce colonies.

A. ANTONELLI.

(5) The experiences of **Bietti**, of Siena, have convinced him that the staphylococcus albus non-liquefaciens is perfectly able to provoke in the eye of a rabbit operated upon for cataract, the formation of exudations in the pupillary field, even when a very attenuated culture has been injected into the anterior chamber. These results confirm those of Tschirkowsky. On the other hand, no infection is produced when the same microbe, even in considerable quantity, is introduced into the conjunctival sac, before or after operation, while panophthalmitis is set up by the staphylococcus aureus under the same conditions. Clinically, post-operative infection with the staphylococcus albus non-liquefaciens must be extremely rare. The presence of this microbe, then, in moderate quantity in the conjunctival sac should not prevent

us from operating, and, moreover, it is met with often enough in the conjunctival sac of subjects about to be operated on without any complication supervening.

A. ANTONELLI.

IV.—CYTOLOGICAL EXAMINATION OF THE CONJUNCTIVAL SECRETIONS.

Lafon.—On the cytological and micro-chemical examination of the conjunctival secretions and its utilisation in clinical work. (*L'examen cytologique et micro-chimique des sécrétions conjonctivales; son utilisation en clinique.*) *Ann. d'Oculistique*, mai, 1910.

Lafon, of Périgueux, considers that the cytological and micro-chemical examination of the conjunctival secretions, without pretending to replace bacteriological examination, or to establish a diagnosis, can supply useful indications, and recommends the following *technique* for carrying it out :

The lower lid having been depressed, secretion is collected in a capillary tube, which is drawn two or three times along the *cul-de-sac*. To avoid the risk of wounding the conjunctiva, care should be taken never to push the point of the glass forwards. The collected secretion is spread on a clean slide, so as to form a film 6 mm. or 8 mm. in diameter, and is dried rapidly at a temperature not exceeding 30° C. Two or three such preparations are made, the order in which they are taken being noted on them, since the cellular elements are usually more diluted in the later ones, owing to the flow of tears caused by the manipulation of the eye. A ring of grease-pencil is then placed on the back of the slide to mark the position of the smear, which is stained with Unna's polychrome blue (fix for 2 or 3 seconds in 1°/100 chromic acid, wash, and dry rapidly, stain with polychrome blue for 10 to 20 seconds, differentiate in absolute alcohol, and dry) or with a 1 in 400 or 1 in 500 solution of methylene blue in distilled water (put a drop of the solution on a cover-glass and drop it on the smear without fixing the latter). For control stains, when there is doubt as to the nature of any elements, a second smear can be stained with cosine and methylene blue (Giemsa, Leishman, &c.), or with pyronine and methylene green (Unna-Pappenheim). The preparation is then examined with an oil immersion lens, and the percentage of the recognisable cells estimated. When the secretion is poor in cells, the proportion of microscopic fields which contain any is noted, as well as the greatest number seen in any one field. Although this method is inexact, it gives a good idea of the intensity of the cellular reaction.

The following appearances are found on examination of a preparation.—Before staining, there is an entanglement of crystals, resembling fern leaves, on a finely granular ground. These crystals disappear during the colouring process. In preparations stained with polychrome blue, three forms of exudation can be recognized, mucous, sero-albuminous, and fibrous. The mucous exudates occur in two forms: (*a*) fibrillary, consisting of round masses not exceeding 50 μ in diameter, made up of an inextricable network of fibrils, stained a brownish-red, or (*b*) hyaline, occurring either as rounded drops not larger than 60 μ stained bright violet, the intensity of the

colour diminishing from the centre to the periphery, or as threads or irregular masses. As a rule, these two forms occur in the same preparation in varying proportions. The sero-albuminous exudates appear as blue drops or masses. The fibrinous exudates are very rare and occur as greenish networks. Many so-called fibrinous false membranes of the conjunctiva consist of a mixture of pus, mucus, and hardened sero-albuminous substances. The conjunctival secretion may also contain fat globules, which can be demonstrated by any of the usual specific stains.

The cells which are present in the conjunctival secretion are desquamated epithelial elements and exudative fixed or migratory connective tissue elements. Some of those are normal, but others have undergone degeneration. The epithelial cells are either large flat polygonal elements from the stratified epithelium of the cornea and pericorneal zone, occurring isolated or in masses, or cylindrical cells from the conjunctival epithelium which are rarer and usually isolated. They are liable to two types of degeneration, melting (*fonte*) and necrosis. In the former the cytoplasm swells and stains badly, the nucleus spreads, and its substance forms a fine reticulum, which stains pale violet and may contain vacuoles. The protoplasm of the cells, which may reach the size of 130μ by 90μ , becomes vacuolated and melts away, so that bare nuclei are frequently found. Ultimately, the nuclear membrane bursts and the *débris* becomes mixed with the fibrillar mucus which forms the basis of the preparation. This type of degeneration occurs chiefly in inflammatory secretions. In cellular necrosis the cytoplasm takes blue stains deeply, especially at its periphery, and contains irregular inclusions, which are regarded by Mayou as micro-organisms but seem to the author to be endo-cellular protoplasmic formations. The nucleus shrinks, takes basic stains more deeply, and sometimes breaks up into irregular fragments while retaining its general form. The cytoplasm shrivels up, and its affinity for basic stains becomes still more marked. Finally, the cell forms a small blackish-blue mass, resembling a foreign body. This basophile necrosis occurs only in suppurative processes. Neutrophile polynuclear leucocytes are almost constantly present in the conjunctival secretion, and may be found in large numbers collected into inextricable masses. They may undergo very rapid degeneration with swelling of cytoplasm, dissolution of neutrophile granules, and the appearance of vacuoles, while the nuclei lose their chromatic filaments and their affinity for basic stains. Finally, their various segments become separated and form homogeneous balls (pyknosis). The cell thus becomes reduced to two or three pale-blue or violet spherules situated in a clear space, and, finally, its membrane bursts and the nuclear *débris* becomes lost in the basis of the preparation. In rare cases the nucleus swells and its segments reunite, giving rise to an appearance resembling a mononuclear cell. The polynuclears, being phagocytes, may contain remnants of micro-organisms.

Neutrophile mononuclear leucocytes undergo changes similar to those which occur in the polynuclears. Eosinophile leucocytes are easy to recognise at first, but their cellular membrane bursts very soon, when their acidophile granules scatter and disappear, leaving a multilobular nucleus, which does not differ from those of the neutrophile leucocytes.

Mast cells are rare, as their tendency to migrate is slight and their vulnerability is great. They rapidly dissolve, leaving an oval nucleus, characterised by the presence of nodules of chromatin applied to its nucleus membrane. Such an isolated nucleus, with some fine basophile granules stained violet alongside of it, may be regarded as the remains of a mast cell.

The appended table gives the percentages of the various forms of cells found in the common forms of conjunctival inflammation :

	Conjunctivitis.	Purulent (e.g., Gonorrhoeal.)	Acute Catarrhal— Koch-Weeks or Pneumococcus.	Morax-Axenfeld Recent.	Morax-Axenfeld Chronic.	Recent Trachoma.	Recent Trachoma Conjunctiva Scraped.	Cicatricial Trachoma.	Xerosis following Trachoma.	Follicular Typical.	Follicular following Gonorrhoeal.	Follicular Acute (Heal.)	Spring Catarrh.	Neuro-paralytic Keratitis.
Polynuclears	98	94	77	69	80	34	81	4	23.5	58	49	35	59
Neutrophils
Mononuclears	present	1.50	...	2.5	...	...	10	1	1	2.5	...	...
Lymphocytes	1	"	20	8	12	30	...	...	56	37.5	44	4.5	6
Eosinophiles	exceptional	0.5	...	0.5	...	...	...	...	2.5	1.5	54	...
Macrophages	2	...	...	...	...	...	...	...
Plasma Cells	"	9	...	...	...	...	0.5	...	4
Mast Cells	"	4.5	...	...	...	...
Transition Cells	1	...	...	...	...
Fusiform Cells	0.5	...	...
Neutrophils
Pseudo-myelocytes	0.5	...	...
Large Round Cells	13	...	...	...	...	...	...	...
Epithelial Cells	1	present	1	23	4	12	19	96	14	1	1.5	6.5	31
Giant Epithelial Cells	present	present	...	...	...	...	...

Lymphocytes may melt or undergo necrosis. Plasma cells occur and may be recognised by their shape and the basophile reaction of their cytoplasm. Like the other cells, they rarely undergo degeneration. Finally, transition forms, macrophages, and blood cells are occasionally seen.

The normal secretion of the conjunctival sac contains epithelial cells, chiefly pavement, derived from the normal desquamation of the cornea and conjunctiva, leucocytes, chiefly neutrophile polynuclears, shewing the constant struggle against the micro-organisms in the conjunctival sac, and mucus, almost entirely of the fibrillar variety.

The author considers that all cases in which epithelial cells are present in more than one-fifth or leucocytes in more than one-tenth of the microscopic fields should be regarded as abnormal, although the latter may be present in one-fifth of the fields without any clinical evidence of disease. In subjects with a copious secretion of tears cellular elements in the conjunctival secretion may be exceptional. The secretion which is usually present at the inner angle of the lids of normal eyes in the morning consists of cellular *débris* and drops of fat. The alterations in the blood in leukaemia, hydatid cysts (eosinophilia), and facial erysipelas were found to have no effect on the cellular contents of the conjunctival secretion.

The effects of conjunctival wounds were studied in cataract operations with sclero-conjunctival section and with no trace of inflammatory reaction. Seventy-four hours after the operation, the author found epithelial cells, leucocytes, and red blood corpuscles, the migratory cells, being, of course, indistinguishable from the extravasated. On the third day the traces of hæmorrhage had disappeared and there were polynuclears (in half the fields), lymphocytes, epithelial cells, and sero-albuminous exudates also present. Between the fifth and tenth days the secretion resumed its normal character. The number of micro-organisms present in these secretions was increased far more than the number of polynuclears, and did not become normal until the bandage was removed.

The formulæ for Calmette's ophthalmo-reaction, when at its height, for Parinaud's conjunctivitis, and for toxic purulent conjunctivitis, such as that caused by the juice of *ecolabium elaterium*, correspond with those for purulent conjunctivitis.

In conjunctivitis accompanying measles the formulæ correspond to those for Morax-Axenfeld conjunctivitis.

In chronic blepharo-conjunctivitis, a few cells are found in all the fields, one-third of them epithelial and two-thirds polynuclears with a few lymphocytes. In the eczematous form the proportion of epithelial cells sometimes reached 75 per cent., owing to rubbing the eyelids.

In phlyctenular conjunctivitis, before ulceration, cells are found in from one-third to one-half of the fields, a good proportion of them being epithelial, but after ulceration, the exudation becomes purulent and contains 94 to 96 per cent. of polynuclears.

The conjunctival secretion of those who wear glass eyes is rich in cells. When the glass eye is kept clean, polynuclears and epithelial cells are present in about equal numbers, many of the latter being cylindrical, but if it is dirty or rough, the secretion is increased and purulent (96 per cent. polynuclears).

In lacrymal conjunctivitis, the secretion is purulent and contains 96 per cent. of polynuclears.

In simple lacrymation, without regurgitation, the polynuclears are increased. In slight cases when the eye weeps only when in the wind or cold, they are present in one-fifth of the fields: but if the lacrymation is constant, they constitute 95 per cent. of the cellular elements and from 5 to 15 of them

were found in each field. In closed mucocles the conjunctival secretion is normal, but in dacryocystitis before pressing liquid back from the sac, there are from 10 to 20 cells in each field, 90 to 95 per cent. of them being polynuclears, while the contents of the sac consist of pus containing 98 per cent. of leucocytes. Foreign bodies in the cornea at first cause increase in the epithelial cells from desquamation caused by attempts to get rid of them by rubbing the lids, etc.; but, later, if the cornea gets inflamed, the polynuclears increase and may amount to 95 or 98 per cent.

In hypopyon-keratitis, the conjunctival exudate is purulent, even when the lacrymal passages are healthy. In the deep forms of keratitis the conjunctival secretion is normal, but in neuro-paralytic keratitis without inflammatory reaction, cellular elements are present in about half the fields in the percentages given in the table. The epithelial cells were mostly necrosed, and the plasma cells were probably derived from the fixed cells of the corneal tissue.

Subconjunctival hæmorrhages and palpebral ecchymoses do not influence the conjunctival secretion, nor do episcleritis, sclero-choroiditis, serous or plastic iritis, iridocyclitis, or acute glaucoma, but the injection accompanying these conditions predisposes the eyes to conjunctival infection.

In patients suffering from acute iritis, examination of the conjunctival secretion does not give any information as to the ætiology or clinical form of the disease, except that an hypopyon always causes an acute conjunctival inflammation with numerous polynuclears. In absolute glaucoma there is always an abundant epithelial desquamation.

The author gives notes of the following cases in which the cytological examination of the conjunctival secretion was clinically useful, *viz.*, two of spring catarrh, one of conjunctivitis due to excessive treatment after getting some infective matter in the eye, and two of conjunctivitis from rubbing the eyelids.

He considers that cataract operations should not be undertaken if polynuclears are present in more than one-fifth of the fields, and quotes the following statistics in support of his view.—A. Eleven cases with no clinical sign of infection and with polynuclears in less than one-fifth of the fields healed without complication. B. Nineteen cases with slight lacrymation and conjunctival hyperæmia, were divided as follows: (a) In 9 there were polynuclears in less than one-fifth of the fields, and 8 of these healed without complication while the ninth, who got infection of the lips of the wound, removed his bandage and rubbed his eye during the first night after the operation. (b) In the remaining 10 there were polynuclears in more than one-fifth of the fields. Of these 3 were treated before operation until there were polynuclears in less than one-fifth of the fields and healed without complication, while 3 of the remaining 7, who had operations performed without such preparation, developed iritis. R. J. COULTER.

V.—THE ÆTIOLOGY OF TRACHOMA.

- (1) Cecchetto, E.—Concerning some peculiarities of the trachoma corpuscles. (Su alcune particolarità dei corpi del tracoma.) *Annali di Ottalmologia*, Vol. XXXVIII, fasc. 8-10, p. 583.

- (2) **Gallenga and Cecchetto.**—Trachoma corpuscles in the epithelium and the connective tissue of granulous conjunctivitis. (*Dei corpi del trachoma nell'epitelio e nel connettivo della congiuntivite granulosa.*) *Ibidem*, Vol. XXXIX, 1910, p. 80.
- (3) **Addario, J., Junior.**—On the presence of the corpuscles of Prowazek and Halberstaedter in the normal conjunctiva of man and of the monkey. (*Sulla presenza dei corpuscoli di Prowazek ed Halberstaedter nella congiuntiva normale dell'uomo e della scimmia.*) *Ibidem*, Vol. XXXIX, fasc. 3-4, p. 221.
- (4) **Gallenga, C.**—On the specificity of the chlamydozoa of trachoma. (*Della specificita dei "Clamidozoi" del Trachoma.* *Ibidem*, Vol. XXXIX, p. 95.
- (5) **McKee, Hanford.**—The trachoma bodies from the normal conjunctiva. *Ophthalmic Record*, June, 1910.

(1) **Cecchetto**, of Parma, confirms the observations of Clausen (Naples Congress, 1909) with regard to the presence of the trachoma corpuscles almost exclusively in the recent and untreated affection, very rarely in the epithelial cells of a trachomatous conjunctivitis touched with silver nitrate or copper sulphate, and never in old-standing or relapsed cases, among young or old subjects. The author describes the details of preparations stained by immersion for twenty-four hours in Giemsa (one drop to each c.c. of water), after fixation by means of alcohol-ether. The protoplasm of the invaded epithelial cells is more or less decolourised; the nucleus is often well preserved and stained red-violet, but sometimes fragmented or altered in such a way as to lend itself to an error in interpretation. The trachomatous corpuscles may flank the nucleus or be separated from the latter to the number of one to three or even more. These corpuscles constantly stain pure azure, which enables them to be recognised at a glance by an experienced eye. The groups of corpuscles have, in general, the form of a crescent or oval, surrounded by a clearer halo. They possess a uniform size, and are sometimes very closely pressed against one another and are sometimes separated, although in a regular enough way, so as to form a group almost comparable with a mass of staphylococci. The number of cells contained by these corpuscles, in a series of microscopical preparations, is very variable; they may be extremely scarce or, on the contrary, more easy to find. In cases of typical trachoma, recent and untreated, they are relatively abundant. A. ANTONELLI.

(2) **Gallenga and Cecchetto** state they have found always the chlamydozoa of Prowazek and Halberstaedter in the tarsal parts of the conjunctiva provided with stratified cylindrical epithelium, but never in the parts with pavement epithelium (bulbar conjunctiva). As to the presence of the corpuscles in the sub-epithelial connective tissue of the conjunctiva, there are numerous sources of error in the correct interpretation of the preparations, such as plasma cells, mast cells, and so forth. After many control experiments, the authors range themselves in line with Greeff and di Santo in recognising chlamydozoa in the connective tissue elements in the midst of the sub-epithelial adenoid tissue or amidst the more or less well formed elements of the trachomatous nodules. In the connective tissue of the newly-formed infiltration of corneal pannus, the authors have so far never succeeded in demonstrating the presence of the corpuscles. A. ANTONELLI.

(3) In a preliminary note **Addario**, of Palermo, describes intra-cellular formations, absolutely identical as regards their form, disposition, staining reactions, etc., with the so-called "trachoma corpuscles," in epithelial

scrapings from five normal human conjunctivas (subjects aged 70 years, 60 years, 20 years, 7 years, and 22 months respectively), as well as in the conjunctiva of a macacus. Addario, therefore, agrees with his father in refusing to recognise the specificity of the corpuscles described by Prowazek and Halberstaedter.

A. ANTONELLI.

(4) After having reviewed the most recent publications dealing with the corpuscles of Prowazek and Halberstaedter, **Gallenga**, of Parma, gives an account of his latest researches among 141 cases. These included 6 cases of ophthalmia neonatorum with and 6 without gonococci, 8 cases of slight catarrhal conjunctivitis with negative bacteriological findings, in newly-born children, 2 cases of gonococcal conjunctivitis in adults, 13 cases of simple catarrhal conjunctivitis, 3 croupal forms, 4 cases of spring catarrh, 48 cases of recent trachoma, and, finally, 51 cases of long-standing trachoma in a state of recurrence more or less serious. Granted the rarity of the corpuscles in forms of conjunctivitis other than the trachomatous, and the differences, although minimal, which may be recognised in preparations, Gallenga persists in believing in the specificity of protozoa chlamydozoa not yet well classified, which are especially to be recognised by their intense azure staining in the interior of the epithelial cells. In cases of recent trachoma, a positive result was obtained 75 times out of 100, while in relapses of long-standing trachoma the corpuscles were found about 30 times in 100 cases. The alleged chlamydozoa of gonococcal ophthalmia neonatorum are, according to Gallenga, much less abundant, slenderer, and made up of smaller granules than the chlamydozoa of trachoma. The author agrees with Prowazek and Halberstaedter in admitting a morphological likeness between protozoa which possess a different pathogenic action.

A. ANTONELLI.

(5) **McKee** (Montreal) could find no trachoma bodies in the conjunctival sacs of healthy adults; but on examining those of healthy infants, he found numerous epithelial cells with the identical inclusions described as characteristic of trachoma. Numbers of cells were seen with the bodies away from the nucleus, and covering the nucleus like a cap. They were more numerous than in some cases of trachoma, and it was impossible even for experienced laboratory men to distinguish one from the other. Two excellent photo-micrographs are reproduced and show the "characteristic" bodies.

J. JAMESON EVANS.

VI.—TUMOURS OF THE LACRYMAL GLAND.

- (1) **Mendez, Enrique**.—Contribution to the mixed tumours of the lacrymal gland. (*Zur Kenntnis der Mischgeschwülste der Tränen-drüse.*) *Klin. Monatsbl. f. Augenheilkunde*, Mai-Juni, 1910.
- (2) **Mendez, Enrique**.—Gumma of the lacrymal gland. (*Gummöse Syphilis der Tränendrüse.*) *Klin. Monatsbl. f. Augenheilkunde*, Mai-Juni, 1910.

(1) **Mendez** describes a clinically benign tumour of the lacrymal gland, the size of a walnut, in a woman, aged 77 years. Extirpation was easy in the absence of adhesions. A very complicated structure was found on microscopical examination. The tumour was surrounded by a fibrous capsule, and consisted chiefly of small round sarcoma cells. Interspersed were remnants of the lacrymal gland, patches of myxomatous and chondro-myxomatous

tissue, and numerous small cysts. The latter had an epithelial lining, in which every variety of epithelium was represented, including epidermis. Glycogen was made out in considerable quantity.

C. MARKUS.

(2) **Mendez** describes microscopical sections of an enlarged lacrymal gland, and arrives at the diagnosis of gumma. The tumour consisted of granulation tissue, with extensive necrotic areas. The granulation tissue was composed of lymphocytes, fibroblasts, and plasma cells: epithelioid cells were scattered throughout the tumour, giant cells were very scarce. Neither tubercle bacilli nor spirochaetes were found.

C. MARKUS.

VII.—TUMOURS OF THE EYELID.

- (1) **Lacausade**.—A contribution to the study of epithelioma of the eyelids. (*Contribution à l'étude de l'épithélioma des paupières.*) *L'Ophthalmologie Provinciale*, T. II, p. 196.
- (2) **Wieder, Henry S.**—Sarcoma of the eyelid, with the report of a case in an infant seven weeks old. *New York Medical Journal*, November 23rd, 1907.
- (3) **Chavernac**.—A curious rare form of symmetrical tumour of the eyelids. (*Une forme curieuse et rare de tumeurs symétriques des paupières.*) *Ann. d'Oculistique*, T. CXXXVIII, p. 417, décembre, 1907.
- (4) **Hesse, Robert**.—On adenoma of Meibomian glands. (*Ueber das Adenom der Meibom'schen Drüsen.*) *Klin. Monatsbl. f. Augenheilkunde*, August, 1910.

(1) **Lacausade** gives a description of a very large epithelioma of the eyelids of 25 years' duration.

(2) The case reported by **Wieder** is of interest: first, because of the age; secondly, because of the situation of the growth; and, finally, because of the peculiar microscopic picture which the growth presented.

Microscopic examination revealed a somewhat varied picture according to the portion of the tumour examined. Parts of the growth were quite compact and cellular, while other parts appeared to be riddled with spaces, "which were apparently fat globules before fixation, etc." The entire tumour was broken into lobules, many of which were separated by a delicate sheet of connective tissue, and others by thin-walled blood vessels.

The size and shape of the cells constituting the cellular portions of the tumour varied greatly. "In portions of the tumour, especially towards the edges, the cells were spindle in shape and all followed the same direction, running parallel with the outlines of the particular lobule in which they were found. In the central portions of the mass the cells were of varying shapes, some being somewhat spindle, others more polygonal, and still others apparently round. The protoplasmic outlines were not very distinct, the protoplasm of the different cells seeming to a certain extent to fuse. There was no intercellular stroma between the individual cells.

"Some portions of the tumour contained abundant blood channels, having no definite walls except those composed of the cells of the tumour proper. In places there were some signs of interstitial hæmorrhage, which was probably caused by operative insults to the tissues. There did not appear to be any melanotic deposit in any part of the tumour."

The portion of the tumour which appealed to Wieder as of particular interest was that in which the sarcomatous cells could be seen to be growing around what appeared to be fat spaces. "This," he says, "was significant as a manifestation either of spreading infiltration into the surrounding fatty tissues, or, what might be more likely in view of the lobulation of the tumour (not alveolation), an evidence that the tumour was originally a lipoma which had undergone sarcomatous degeneration, and was still in the process of that change."

The subsequent history, in which it was found that a recurrence appeared in two weeks, rendered it improbable that healthy tissues had been invaded during the extirpations of the growth, but more likely that a small microscopical portion of the tumour had been left behind, which would tend to substantiate the view of the lipomatous origin of the growth. CHARLES A. OLIVER.

(3) **Chavernac's** case was that of a woman with a pyriform tumour on the lower lid of each eye, that on the left side being the larger. These had commenced after a normal labour thirteen years previously, and were about the size of oranges. They were mobile and non-adherent, and the skin over and around them was soft and of normal colour. The patient's general health was good, and she had never had erysipelas. On removal, the tumours were found to consist of abundant yellow serous fluid which did not coagulate on heating, and was contained in the meshes of the subcutaneous cellular tissue.

The case is taken from the case-book of the author's father, by whom it was treated in 1874. R. J. COULTER.

(4) **Hesse** describes a tumour of the upper lid in a woman, aged 64 years, which showed rapid growth and early recurrence after the first excision. At the time of the second operation the whole upper lid was implicated in a hard, irregular, partly ulcerated growth; the lymph glands in the neighbourhood were not enlarged. Microscopical examination proved the tumour to be an adenoma of the Meibomian glands tending to malignancy, as evidenced by beginning infiltration of the surrounding connective tissue. C. MARKUS.

VIII.—TUMOURS OF THE EXTRINSIC MUSCLES OF THE EYEBALL.

- (1) **Calderaro**.—Angioma of the anterior extremity of the rectus internus. (Angioma dell estremità anteriore del retto interna. *Contributo chirurgico*.) *La Clinica Oculistica*, September, 1907.
- (2) **Pascheff**.—On tumours of the extrinsic eye muscles. (Les tumeurs des muscles extrinsèques de l'œil.) *Ann. d'Oculistique*, T. CXL, p. 249, octobre, 1908.

(1) Angioma of the conjunctiva is a rare condition. **Calderaro** has seen, however, three cases of angioma of the plica semilunaris within a short time. The case on which the present notes are based was interesting, not only as a clinical rarity, but also on account of the surgical measures which were adopted for its relief. The little tumour was situated on the inner side of the eye. It was more or less bilobed, the surface generally smooth, but irregular as the surface of varicose masses elsewhere; the conjunctiva was freely movable over the tumour, but this was firmly adherent to the globe. Pressure caused the mass to disappear, with corresponding turgescence of the caruncle. There was no apparent pulsation. When the eye was moved laterally, the

sulcus on the tumour became deeper, showing the relation to the tendon of the internal rectus. At the time of operation, it was found that the fibres were separated by the enlarged venules. The tendon was therefore divided about 5mm. from its insertion, and the angiomatous tissue carefully removed from beneath. The recovery was complete.

Calderaro quotes two similar cases, in each of whom the same muscle was affected.

H. GRIMSDALE.

(2) **Pascheff**, of Sofia, records cases of the following tumours of the extrinsic muscles of the eye.—(1) Alveolar sarcoma commencing within the eye and spreading apparently along the anterior ciliary artery of the superior rectus, to develop in the anterior part of that muscle which was much enlarged behind the tumour, owing to hypertrophy of its fibres, and contained an isolated sarcomatous nodule close to its central vessels, some distance from the main mass of the neoplasm; (2) lipoma adherent to the external rectus; (3) cysticercus cellulosæ adherent to the body of the external rectus.

The author gives a *résumé* of the cases of tumour of the extrinsic muscles of the eye, recorded in ophthalmic literature, from which he has constructed the appended table:—

I. Malignant tumours	{ A. Sarcomata	{ 1. Primary
	{ B. Cancers	{ 2. Of intra-ocular origin
	{ A. Solid	{ 3. Metastatic
	{ tumours	{ 1. Fibro-myoma
II. Benign tumours	{ B. Cystic	{ 2. Angio-fibroma
	{ tumours	{ 3. Angioma
		{ 4. Lipoma
		Cysticercus cellulosæ
III. Pseudo-tumours	{ 1. Gummata	
	{ 2. Tuberculous sclerosis	
	{ 3. Syphilis	
	{ 4. Hyaline degeneration	
	{ 5. Ossification	

R. J. COULTER.

IX.—TUMOURS OF THE IRIS.

- (1) **Coats, George**.—An unusual form of cyst of the iris. *Royal London Ophthalmic Hospital Reports*, Vol. XVII, Pt. I.
- (2) **Martin and Augi  ras**.—Observation on primary melano-sarcoma of the iris. (Observation de m  lano-sarcome primitif de l'iris.) *Recueil d'Ophthalmologie*, ao  t, 1907.
- (3) **Martin, Henri, and Augi  ras**.—A case of primary melano-sarcoma of the iris. (Observation de m  lano-sarcome primitif de l'iris.) *L'Ophthalmologie Provinciale*, T. IV, p. 85, septembre, 1907.
- (4) **Shoemaker, W. A.**—Primary sarcoma of the iris with report of a case of leuco-sarcoma of the iris and cysts of the ciliary body. Histological examination by Adolf Alt. *American Journal of Ophthalmology*, March, 1909.
- (5) **Oatman, Ed. L., and Webster, David**.—Report of a case of cyst of the iris. *Archives of Ophthalmology*, January, 1910.

- (6) Waldstein, E. — A case of iris-tumour. (Zur Kasuistik der Iristumoren.) *Klin. Monatsbl. f. Augenheilkunde*, März, 1910.
- (7) Bergemann, H. — On congenital cysts of the iris. (Beitrag zu den Angeborenen Iriszysten.) *Arch. f. Augenheilkunde*, April, 1910.
- (8) Passera, E. — A study from the clinical and anatomical-pathological standpoints of spontaneous serous cysts of the iris. (Studio clinico ed anatomico-patologico sulle cisti sierose spontanee dell'iride.) *Ophthalmologica*, Vol. I, Fasc. 5.

(1) This is the case of a gentleman, aged 81, who had a small bluish black swelling of the iris close to the ciliary margin, which was diagnosed as a sarcoma, and the eye was excised. When cut, the tumour could be seen to be a cyst of the iris. There was some desseminated choroiditis, but otherwise the eye was healthy.

The cyst was divided into three intercommunicating loculi which split the iris. It had an external lining of pigment epithelium. The tumour arose in the epithelial lining of the anterior part of the ciliary body, and the author discusses the steps which led to its formation. From its tubular structure it is classed as an adenoma, although this is somewhat misleading, for it but superficially resembles a true adenoma; the author prefers to call it an "epithelial hyperplasia." Two photomicrographs illustrate its macroscopic and microscopic appearance.

C. DEVEREUX MARSHALL.

(2) **Martin and Augiéras** record a case of primary sarcoma of the iris in a man aged 33 years. The tumour was of the size of a lentil, brown in colour (iris blue), and was situated between the corneo-iridic angle and the circulus minor at the inner end of the horizontal meridian. It encroached a little on the cornea near the angle, and caused some corneal haze at that point, and a thickening and increased vascularity of the conjunctiva between the caruncle and the part of the limbus corresponding to the tumour. Below the main tumour, and in the region of the limbus, there were two smaller tumours of the same nature, but of the size of a pin's head. The vision in the affected (left) eye was reduced to $1/8$. There were no subjective symptoms beyond this, and no pain was complained of. The fundus was hazy and there was a sprinkling of small, flat, pigmented spots in the choroid at the posterior pole of the eye.

The eye was excised, but over four years later, the patient died from recurrent sarcomatous growths in the liver, skin, and stomach. There were no orbital or intra-cranial growths.

J. JAMESON EVANS.

(3) **Martin and Augiéras** record a case of primary melanosarcoma of the iris. The patient had noticed the tumour four years previously, but did not seek advice about it until his sight began to fail. The eye was removed, but five years later, the patient died of metastases in the liver, spleen, and subcutaneous tissue, and probably in the stomach.

(4) **Shoemaker's** case of primary sarcoma of the iris in which at a very early stage iridectomy was performed, and, later on, enucleation on account of repeated hæmorrhage, deserves to be read closely on account of the conclusions drawn from a study of such cases in literature. The description of the condition found histologically may be omitted for brevity. As to *diagnosis* (1) the case illustrates the difficulty of distinguishing between a leuco- and a melano-sarcoma. What Shoemaker took to be a part of a melano-sarcoma was simply a part of the pigmented layer of the iris pushed into the pupillary space by the leuco-sarcoma. (2) Sarcoma of the iris may be confounded with melanoma, cyst, gumma, tubercle. Melanoma and nævus are congenital stationary growths while sarcoma is progressive

Melanoma is darker in colour, does not usually project above the plane of the iris, and does not cause inflammation.

Cysts of the iris have a bluish transparent appearance, are usually round, and are generally the result of trauma. In the non-inflammatory stages of trauma the differential diagnosis from gumma and tubercle is not difficult, as both the latter promptly set up inflammatory reaction. In the second stage (stage of inflammation) it is not so easy. In sarcoma the iris reacts to a mydriatic except at the site of the growth. In tubercle and gumma the iritis is usually severe, the aqueous hazy, and hypopyon is often present. The presence of multiple tumours does not necessarily indicate tuberculosis, since multiple growths are sometimes found in sarcoma. A gumma will respond to mercury and iodide with the proper local treatment. The tuberculin test will, according to C. S. Bull (*Medical Record*, Dec. 9th, 1905), produce a general reaction in at least eighty-five per cent. of the cases, and some local reaction in about fifty per cent. [Exact meaning of this is not perfectly clear. The presumption is that cases of tuberculosis are referred to.—E. T.]. The *treatment is effective removal*. What constitutes effective removal? A study of Wood and Pusey's collection of ninety recorded cases of primary sarcoma of the iris (*Archives of Ophthal.*, 1902, p. 323), or rather of the fifty-seven of these which came to enucleation, has led Shoemaker to the extremely important conclusion that iridectomy is not safe, however localized the growth may appear to be, and that the eye should be enucleated as soon as the diagnosis is made.

ERNEST THOMSON.

(5) The cyst filled the nasal third of the anterior chamber and was attached to a corneal opacity which was the cicatrix from a wound received at twelve years of age. The patient was aged 48, and had only suffered any pain in the eye, which was blind, for a few months. After enucleation, it was found that the cyst had an external endothelial layer and an internal epithelial layer, this latter being derived from the cornea or conjunctiva.

ROSA FORD.

(6) **Waldstein** describes an iris-tumour larger than a pea, with an uneven, richly vascularised surface, and an orange colour. It occupied nearly the whole upper-inner quadrant, projected somewhat beyond the pupillary margin, but did not extend quite to the root of the iris. It was removed by iridectomy, and the patient was free from recurrence a year after the operation. Histologically, the growth was an endothelioma. Although Waldstein is inclined to agree with those pathologists who regard every so-called endothelioma as being really an epithelioma, he thinks the term justified from a clinical point of view, denoting a benign growth of the iris as compared with pigmented sarcoma. Leucosarcoma shares this comparative benignity, but in this respect Wintersteiner is quoted, who thinks that many a case of so-called leucosarcoma of the iris was really one of endothelioma. It follows that in non-pigmented tumours of the iris, the more conservative methods of surgical interference are indicated.

C. MARKUS.

(7) **Bergemann** reports the following case.—A healthy, well-developed boy, nine months old, was brought to him with the observation, that a dark spot which seemed to be growing larger, had been noticed on the left eye. On examination, Bergemann found a hemispherical, greyish elevation below the pupil, extending from the root of the iris to about $\frac{1}{2}$ mm. above the lower margin of the pupil. The anterior chamber was shallower than in the right eye, but the tension was not raised. The pupil had the shape of a horizontal ellipse and did not react to light as well as the right one. The child had not had a fall or a blow. The confinement had been normal: no instruments had been used. Bergemann removed the cyst and made a histological examination. The wall consisted of several layers of epithelial cells lying in contact with

the stroma of the iris, but no connection was found between the cyst and the pigment layer of the iris.

PERCIVAL J. HAY.

(8) **Passera** records very fully and carefully the facts regarding a case of spontaneous cyst of the iris which he saw in the *clinic* of Prof. Raymond. The right eye was normal. The left showed the presence of a translucent cyst growing from the upper and outer part of the iris. There was no history of injury. The growth was increasing rapidly in size and the eye was becoming irritable. The vision, with suitable correction, was normal, and the tension also was normal. There was no pain. The fundus presented the normal appearance, but there was a moderate amount of astigmatism. As the cornea was not so highly astigmatic, it was presumed that the pressure of the cyst on the lens was causing some displacement. At a later date, the cornea was found to be more highly astigmatic, and, as the eye was becoming more irritable, it was decided that the cyst should be removed. Prof. Raymond made an incision in the outer part of the cornea (4 mm.) and through it punctured the cyst. He then introduced a pair of iris forceps and withdrew the lining membrane and ultimately performed iridectomy. The eye healed well and quickly. The fluid from the cyst (preserved by the use of a Pagenstecher's spoon) was found to contain only a few cell elements. The lining membrane of the sac was composed of several layers of stratified epithelium.

The whole case is very completely gone into, and a most copious bibliography is given (from 1830 onwards) of all cases of cyst of the iris recorded in literature.

LESLIE BUCHANAN.

X.—INJURIES BY ANILIN PENCILS.

- (1) **Enslin, E.**—Contributions to the injuries of the eye by copying pencils. (*Beiträge zu den Verletzungen des Auges durch Tintenstift.*) *Zeitschr. f. Augenheilkunde*, Dezember, 1906.
- (2) **Snell, Albert C.**—Injury to the eye from the presence of anilin pencil in the conjunctival cul-de-sac. *Ophthalmology*, January, 1910.
- (3) **Dunn, J.**—Two cases of enucleation necessitated by getting into the conjunctival sac the point of an anilin pencil. *Archives of Ophthalmology*, March, 1910.

(1) **Enslin** reports three cases of injury to the eye by bits of anilin violet pencil. They varied in intensity, according to the quantity of stuff which got into the eye and the length of time it remained there. In the last case an extensive corneal ulceration with hypopyon was produced. Cultures were made from the corneal ulcers and were found to be sterile, bearing out previous assertions, *viz.*, that the process is a purely chemical one.

A. LEVY.

(2) **A. C. Snell's** patient, a girl of 14, received the point of an indelible pencil in her eye. When seen about an hour after the injury, there were swelling of the lids, photophobia, blepharospasm, lachrymation, chemosis, loss of the corneal lustre, and purple staining of the lids, bulbar and palpebral conjunctivæ, and aqueous. The pencil point was found embedded in the conjunctiva, between the cornea and the lower *cul-de-sac*. The staining of the aqueous was most dense in its lowest part and faint above. The

foreign body had acted in a caustic manner, producing a necrotic ulcer of the conjunctiva. The pain and other symptoms persisted for three days after the removal of the anilin pencil, then the pain disappeared and the staining rapidly cleared up, until, by the end of the second week, it had quite gone.

The author adds brief references to seven published cases of similar injuries to conjunctiva and cornea, and also to A. Vogt's experiments with anilin on the eyes of rabbits,* and draws some useful conclusions. The insoluble and acid forms of anilin do little harm, but the basic and soluble forms are strong irritants and may produce necrosis and sloughing. Vogt found experimentally that the best medium for neutralising the anilin material was a 10 per cent. solution of tannic acid. Tannic acid lotions may therefore be used for this purpose, and hydrogen peroxide to assist decolourising, but apparently there is no need to fear permanent staining. It is important to get rid of all the injurious matter as soon as possible by irrigation. A. J. BALLANTYNE.

(3) A piece of an anilin pencil flew into the patient's eye and was allowed to remain there four days. When removed by Dunn, the underlying conjunctiva and adjacent layers of the sclerotic were necrotic, and there was intense conjunctivitis and keratitis. The patient did not return for three days and there was then panophthalmitis, which necessitated enucleation. At the first visit, Dunn washed out the sac with a 5 per cent. solution of tannin, and afterwards used atropine.

The second case, which occurred in the practice of a *confrère* of the author's, was very similar to his own. ROSA FORD,

XI.—DETACHMENT OF THE RETINA.

- (1) van Geuns, J. R.—A case of detachment of the retina occurring three years after the healing with full vision of a penetrating wound. (Een geval van solutio retina drie jaar na een met vollen visus genezen verwonding.) *Ned. Tydschrift voor Geneeskunde*, 1909, p. 513.
- (2) Bergmeister, R.—On the detachment of the pars ciliaris retinae and the tearing of the retina from the ora serrata. (Ueber die Abhebung der pars ciliaris retinae und das Abreissen der retina an der Ora Serrata.) von Graefe's *Archiv f. Ophthalmologie*, Bd. 71, 3 Heft, September, 1909.
- (3) Purtscher, A.—Tear of the retina in the macula region in detachment of the retina. (Netzhautris in der Gegend der Macula bei Abhebung der Netzhaut.) *Zeitschrift für Augenheilkunde*, September, 1909.
- (4) Klauber, Erwin.—Separation of retina and disc from the optic nerve. (Lostreunung der Netzhaut sammt dem Sehnervenkopfe vom Sehnerven.) *Klin. Monatsbl. f. Augenheilkunde*, April, 1910.
- (5) Rönne, Henning.—The anatomy of striation after retinal detachment. (Zur Anatomie der Streifenbildung nach Netzhaut-abhebung.) von Graefe's *Archiv für Ophthalmologie*, Bd. 57, 2 Heft, 10 mai, 1910.

* For abstracts see THE OPHTHALMOSCOPE, 1906, pp. 363 and 643.

(1) **van Geuns** saw a patient immediately after the injury had taken place and found a wound in the sclera not, in his opinion, penetrating the choroid or the retina. The wound was sutured and healed rapidly. Patient left the hospital with full vision. In the fundus a small white cicatrix could be seen. Three years elapsed without any disturbance whatever, then the patient returned with a small detachment of the retina, which, in a few weeks, became total. G. F. ROCHAT.

(2) **Bergmeister** thinks that detachment of the pars ciliaris retinæ is much more common than is generally suspected, but, as a rule, only the unpigmented layer is affected, while the retinal pigment remains in position. This sometimes produces a cyst-like appearance. Detachment of both layers is extremely rare. R. GRUBER.

(3) The appearance described and illustrated by **Purtscher**, of Vienna, is a typical pear-shaped macular hole in a detached retina, a condition very rarely seen, although tears in other situations are not uncommon. In discussing the literature, the author mentions a case shown by Treacher Collins to the Ophthalmological Society. T. HARRISON BUTLER.

(4) **Klauber** examined microscopically an eye which had to be enucleated on account of irido-cyclitis following an injury. Although no foreign body in the interior of the eye had been suspected, an iron splinter was found in the vitreous, behind the lens, surrounded by a capsule of organized exudation. There was a complete detachment of the retina, and the disc was found in connection with the retina, separation from the optic nerve-trunk having occurred at the level of the lamina cribrosa. C. MARKUS.

(5) Where a detached retina has totally or in part returned to its normal position, we sometimes meet with a characteristic ophthalmoscopic appearance. Part of the fundus displays a more or less marked diffuse discolouration, consisting of irregular pigmentation alternating with whitish spots. This portion corresponds to the former detachment, and its boundary is well-defined by a white stripe, which often starts, festoon-like, from both sides of the optic disc, and which sometimes contains a little patchy pigment. Besides that, we find other more or less irregular lines or striae, straight or bifurcating, and more or less parallel to the line of demarcation, which correspond to the folds of the detached retina. Up to now, two cases of this kind have been anatomically examined, both from Uhthoff's *Klinik*, to which **Rönne** adds a third, which does not materially differ from the others. There was a considerable amount of subretinal exudation leading to the formation of connective tissue which attached the much degenerated retina to the choroid. It seems probable that the white patches which remain after recovery from retinal detachment are not always due to choroidal atrophy, but also sometimes to the formation of connective tissue between the retina and choroid. R. GRUBER.

XII.—MOOREN'S ULCER OF THE CORNEA.

- (1) de Berardinis, D.—Ulcus rodens corneæ treated by transplantation of corneal tissue from the rabbit. (*L'ulcera rodente della cornea curata mediante la eteroplastia di tessuto corneale di coniglio.*) *Annali di Ottalmologia*, Vol. XXXV, Fasc. 10-11, p. 835.
- (2) Gallemaerts.—Rodent ulcer. (*Ulcus rodens.*) *Bull. de la Société belge d'Ophtalmologie*, No. 28, 1910, p. 16.

(1) In a case of typical rodent ulcer, consecutive to an injury (*escarquille* from coal involving the limbus and the edge of the cornea) in a woman of 26 years, otherwise healthy, **de Berardinis**, of Naples, after having tried in vain local remedies, cauterisations, subconjunctival injections, etc., decided to excise with a very fine blade a certain thickness from the peripheral zone of the affected cornea, and to cover the defect thus made by a flap taken from a rabbit's cornea, held in place by sliding it beneath the limbal conjunctiva, detached for the purpose. Both eyes were bandaged after the operation. When examined at the end of four days, the flap was found to be adherent, but a little swollen. After several weeks (the case was dressed every three days), the flap presented a normal surface, smooth, polished, and of greyish colour, the conjunctiva being almost free from injection and the visual acuity normal. Bacteriological examination, made at the beginning of the ulcerous process by cultures in bouillon and on agar, showed a bacillus arranged in tetragon form, which was capable of setting up in the eye of a rabbit a corneal infiltration of torpid type.

A. ANTONELLI.

(2) According to **Gallemaerts**, of Brussels, rodent ulcer is a rare form of keratitis which cannot possibly be confounded with any other affection of the cornea. In addition to undermining the superficial layers of the cornea, it also gives rise to a wide detachment of the conjunctiva in its neighbourhood. The affection, which usually lasts for several months, ends, as a rule, in loss of vision. In a patient presented by Gallemaerts to the Belgian Ophthalmological Society the borders of a rodent ulcer had been excised by means of Graefe's knife, and the conjunctiva, first detached all around the cornea, had then been drawn over the denuded surface by the aid of sutures above and below. The result was good. It is worthy of note that, contrary to rule, hypopyon was present in Gallemaerts' case. The author is strongly of opinion that no time should be wasted in cauterising cases of ulcerous rodens, the treatment of which should consist in excision of the lesion and in covering the wound with conjunctiva, either obtained from another subject or from the patient himself.

SYDNEY STEPHENSON.

XIII.—CONICAL CORNEA.

- (1) **Chevallier**.—Contribution to the study of keratoconus. (*Contribution à l'étude du kératocône.*) *L'Ophthalmologie Provinciale*, novembre, 1909.
- (2) **Wibo, M.**—Dyscrasic states and keratoconus. (*Etats dyscrasiques et kératocône.*) *Bull. de la Société belge d'Ophthalmologie*, No. 27, 1909.

(1) This is an excellent article by **Chevallier**, of Le Mans, on keratoconus, as far as present knowledge of it is concerned, but it contains nothing new.

The pathology of the condition is first dealt with by reference to the theories of His and Panas, Elschnig, Schlaefli, Gullstrand, etc.

Treatment is divided into three heads: medical, surgical, and optical. The author's conclusions are, that medical treatment alone is inefficient, and should only be considered as an aid to surgical or to optical treatment. The surgical measure favoured by him is that of iridectomy, supplemented, in the cases where the condition is progressive, by cauterisation of the cone, with

perforation of the cornea; or, more rarely, by excision of the cone, according to Badal's method (this is given as Badal described it in the *Archives d'Ophthalmologie*, 1902).

Optical treatment should be tried, preferably after surgical measures, but without too much being expected from it. BERNARD CRIDLAND.

(2) Despite our knowledge of the symptomatology, the aetiology of conical cornea is quite unknown to us. Elschnig's hypothesis is attractive. It assumes a chronic lesion of the endothelium of Descemet's membrane. The following experiment tells in its favour.—When the elastic membrane of Descemet is ruptured in a rabbit by means of a curved needle, an opalescent keratoconus rapidly makes its appearance. The deformity produced in this way lasts scarcely longer than eight or ten days. As the membrane of Descemet may be looked upon as the product of the activity of the endothelium, we can understand without difficulty that a chronic affection of the endothelium may determine reduced resistance of Descemet's membrane, and thereby realise the conditions necessary for the development of the staphyloma. As to the nature of this affection of the epithelium, we know nothing certain. Ought we to assume a purely local inflammatory condition, or ought we, with Rampoldi, to admit the influence of some general cachectic state upon the deeper layers of the cornea?

To Wibo, of Brussels, Rampoldi's view appears to find some support in the fact that the affection is bilateral. It cannot be disputed that sufferers from conical cornea present with remarkable frequency some dyscrasic change, which accounts for the alteration in the organic liquids, and which often leads to defective action of the internal glands. Wibo believes that in the early stages cure is possible if we can only successfully combat the dyscrasic state that is responsible for the corneal condition, a claim in proof of which he brings forward the following two cases:—

Cases.

1.—A man, aged 40 years, consulted Wibo for keratoconus of his left eye, which had been present for a year. The summit of the cone was slightly opaque. The sight of the other [right] eye had been failing for several weeks. On examination of the right eye, the cornea showed no appreciable change to oblique illumination, but with Placido's disc, the keratoscopic image was distorted, and, on skiascopy, in addition to slightly irregular inverse astigmatism, the well-known appearance of conical cornea was present. V. = about 1/8. Sight could be bettered by a concave cylinder, 2D., with its axis slightly inclined from the vertical, and a stenopaic opening. The patient's general symptoms pointed, in Wibo's opinion, to hyper-activity of the thyroid body, and so Moebius's serum was administered in ascending doses. After a couple of months' treatment, the patient's general health showed a considerable improvement, the symptoms of hyperthyroidisation disappeared, and sight, without a glass about 2/3, was brought to unity with a concave cylindrical lens of 0.75 D., with its axis 105° temporal.

2.—A female, aged 27 years, had been affected with left keratoconus for about four months, and the condition was becoming worse. The right eye was emmetropic, with vision equal to unity. For three years the patient's state had been deplorable. She suffered from myxoedema. The eye was treated with myotics, and the general condition by injections of iodized oil. Although the general health improved, the centre of the staphyloma had become opalescent. Moreover, the sight of the previously good eye had sunk to 1/6, and although there was no appreciable deformity of the cornea, there was an irregular oblique astigmatism which had not been present before. When Placido's disc was employed, it was found that the keratoscopic image was distorted. The patient still read with ease by holding the book near the eyes. The patient was now treated by the administration of tablets of thyroline, 10 centigr., of which one tablet was at first given daily and at the end of three weeks, five tablets a day. Six weeks after thyroid treatment had been commenced, the sight of the right eye has reached 1/2 (almost 2/3) and the astigmatism, without having disappeared completely, was readily corrected by a weak concave cylinder, which brought the visual acuity to normal. The condition of the other eye (left) was not influenced.

SYDNEY STEPHENSON.

9, VERE STREET, CAVENDISH SQUARE, W.

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NEW INSTRUMENTS.

A new and most interesting instrument has been introduced for the purpose of measuring surface illumination. This is a most important

Lumeter. matter, and one which for want of instrumental aid has been neglected. When fitting up test-types, and even when they are fitted, it is a great consideration to be able to maintain the illumination at a constant value. Further, the illumination of all parts of the test-types should be equal. With the assistance of the Lumeter these conditions may be easily maintained and any particular value of surface illumination obtained or repeated. The importance of being able to retest a patient under the same conditions of illumination cannot be overestimated. It is also of great value to those ophthalmic surgeons called upon to report on the illumination of school-rooms.

The instrument itself is quite portable and in appearance take the form of a box, with an eye-piece and an aperture which is directed towards the surface whose illumination is to be measured. On looking through the eye-piece the observer looks directly at an illuminated screen, and sees through an aperture therein the surface under test. By a most ingenious arrangement the illumination of the screen may be varied by definite amounts until the illumination of the surface under test and that of the screen are alike. The value of the illumination is then read off on a scale. It is possible with the Lumeter to measure values of surface illumination from $\frac{1}{100}$ of a foot candle to 100 foot candles. A valuable feature of the instrument is that the portion of the surface under test at a time is small, rendering it possible to measure the differences of illumination over a surface, with great accuracy.

The lenses in a trial case should be of such a form that, when a spectacle lens has been made from a trial frame combination, that

Trial Case. spectacle lens should have as nearly as possible the same power as the trial combination. With the usual double convex and concave spherical and plane convex and concave cylindrical lenses this is not the case, and the errors arising may be quite appreciable. To overcome this defect as far as possible a trial case has been introduced, all the lenses of which are plane on one side. A much closer approach to accuracy is obtained by this means. The case is made up in a most complete form. It contains 64 pairs of spherical and 40 pairs of cylindrical lenses. There are also 10 prisms and 10 discs and all are arranged in a manner convenient for use.

It is a very difficult matter to arrange test types to the best advantage, and one of the greatest difficulties is to illuminate them evenly

Test Types. without glare and without the source of illumination being obtrusive. As a result of experiment a new form of the revolving box type has been produced. The types are clearly engraved and blacked on translucent opal glass. Four of these types form the four sides of the revolving box. By a very careful arrangement of internal illumination an equal brightness of all parts of the type in use is obtained. It is made in two forms, to stand on a tripod foot, or to hang from the ceiling or a wall bracket.

It is possible that a small oscillator may be of interest to the Ophthalmic Surgeon. A vibrator has the disadvantage that the vibration

Oscillator. is the result of a direct mechanical movement, and therefore impossible. In the new form just made this is not the case.

A solenoid is used with a soft iron core so arranged that as the core moves under the attraction of the current it reverses the current and so a continuous movement is obtained. This vibration is communicated to the objective by the reactionary movement of the case of the instrument as a result of the core movement. The oscillator measures 2-in. by $\frac{1}{2}$ -in. diameter, and weighs complete $1\frac{1}{2}$ -oz., taking a current of 2 volts from a small dry cell.

The first issue of "Ophthalmic Instruments" will appear Jan. 1st, 1911.

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XIV.—THE FUNDUS CHANGES IN CHRONIC CYANOTIC POLYCYTHÆMIA.

Parker, Walter R. and Slocum, George.—Report of two cases of chronic cyanosis with polycythæmia, including ophthalmoscopic examination. *Trans. Amer. Ophthal. Society*, Vol. XII, Part II, 1910.

In 1892, Vaquez (*Bull. Méd.*, 1892, Vol. VI, p. 849) reported a case of polycythæmia, and some years later William Osler (*Amer. Journ. Med. Sci.*, August, 1903) brought forward four cases and added five more from literature. Osler claimed that this symptom-complex, characterised by increase in the red blood corpuscles, enlargement of the spleen, and chronic cyanosis, formed a definite clinical entity, new to medical science. To this grouping of symptoms the name "*chronic cyanotic polycythæmia*" or "*the Osler-Vaquez disease*" is applied. Its ætiology is unknown. A more or less characteristic appearance has been found in all the cases so far examined with the ophthalmoscope. This is marked by distension of the retinal veins, with consequent œdema of the retina, together with occasional hæmorrhages. Uhthoff has emphasised the importance of ophthalmoscopic examination in every case, since he believes that the milder forms of the disease are commoner than is generally supposed.

The following cases are now reported by **Parker and Slocum**, of Detroit :

CASES.

1.—Male, aged 43 years, who complained of difficulty in breathing, palpitation, frontal and occipital headache, chronic cyanosis, dropsy and general weakness. Symptoms dated from thirteen years. On examination, a "startling degree of cyanosis," deepened by exercise and psychic disturbances. Eyes prominent, especially the right eye, which protruded 6 mm. further forward than the left. Conjunctivæ suffused. The blood was of a very deep-red colour, was extremely viscous, and was spread on a slide with great difficulty. The red cell count was 6,540,000; the white cells were about 6,500; and the hæmoglobin was 100% *plus*. There was nothing peculiar about the size or the shape of the red cells. At a later period, the specific gravity of the blood was 1062, and the red cell count 7,400,000. Urine contained a moderate amount of albumin. What was believed to be a tumour was discovered in the mediastinum by screen examination and radiogram. The spleen was enlarged. The fundus changes included tortuous and dilated retinal veins, localised œdema of the retina, small aneurisms of some of the retinal arteries and veins, and pulsating arteries. The nasal half of each optic disc was veiled by œdema, and the macular region was œdematous and slightly deeper in colour than the surrounding retina.

2.—Male, aged 31 years, complaining of severe frontal headaches, blurring of sight, and diplopia, associated with extreme general weakness. Symptoms had been present for one year. On examination, general cyanosis; spleen one inch below costal margin on deep inspiration; red blood corpuscles, 8,000,000 to 9,000,000; white blood cells, 14,000; hæmoglobin, 110%. Ophthalmoscopically, margin of discs blurred, hyperæmia of retina, œdema around discs. Veins much engorged, tortuous in course and dark in colour.

SYDNEY STEPHENSON.

XV.—THE JEQUIRITY TREATMENT OF EPITHELIOMA.

- (1) Rampoldi, R.—The therapeutic action of jequirity in certain cases of cancer. (*Azione terapeutica del jequirity in alcuni casi di cancro.*) *Annali di Ottalmologia*, Vol. XXXVIII (1909), fasc. 1-2, p. 74.
- (2) Fumagalli, A.—Some cases of epithelioma of the eyelids, orbit, and of the conjunctiva treated with jequirity, according to Rampoldi's method. (*Osservazioni sopra casi di epitelioma palpebrale, dell' orbita e della congiuntiva, curati colla jequiritina; metodo Rampoldi.*) *Ibidem*, p. 94.

- (3) Rampoldi, R.—The therapeutic action of jequirity in cancer: seventh communication. (*Azione terapeutica del jequirity in alcuni casi di cancro: VIIa comunicazioni.*) *Ibidem*, Fasc. 3, p. 230.
- (4) Bialezzi, C.—A contribution to the treatment of palpebro-conjunctival carcinomata by Jequirity—the method of Rampoldi. (*Contributo alla cura dei carcinomi palpebro-congiuntivali col jequirity, metodo Rampoldi.*) *Ibidem*, p. 238.
- (5) Denti, F.—Jequiritine in the treatment of epitheliomata of the eyelids. (*La jequiritina nella cura dell' epitelioma palpebrale.*) *Ibidem*, Fasc. 4, p. 258.
- (6) Farina, M.—Upon the action of jequirity in some cases of cancer. (*Sull'azione terapeutica del jequirity in alcuni casi di cancro.*) *Ibidem*, p. 258.

A few particulars as to the treatment of epithelioma of the eyelids, etc., by means of jequirity were printed in THE OPHTHALMOSCOPE of December, 1910, p. 917 and 918. Abstracts of further communications dealing with the same subject are given below:

(1) This is the sixth communication in which **Rampoldi**, of Pavia, insists upon the action of the fluid extract of jequirity (injections) on cancerous tissues. He has also obtained equally good results from jequirity in cutaneous tuberculosis. That goes to prove the clinical relationships between the two affections, of which it is so important to study the pathogeny and the nature. According to Rampoldi, even jequirity fever presents a great analogy with tuberculin fever.

A. ANTONELLI.

(2) Two cases of epithelioma of the orbit which had relapsed after intervention, one case of epithelioma of the ocular conjunctiva, and one case of widely-spread tuberculosis of the upper palpebral conjunctiva have been treated by **Fumagalli**, of Turin, with the aid of the gelatine discs of jequiritine prepared by Zambelletti, of Milan, according to the Rampoldi-Capini formula, or by the aid of liquid jequiritine. Reaction after the injection of one or two drops of the fluid extract of jequiritine is sometimes violent (considerable œdema, hard and widely spread, gangrenous eschar at the seat of injection), but the elimination of the neoplastic nodule appears to be complete and definitive. The application of the gelatine discs or simple brushings with the fluid extract over the ulcerated surface of the neoplastic or tuberculous nodule sets up moderate reaction: the neoplastic or granulous *bourgeons* necrose and become eliminated by sphacelus, and in that way one obtains considerable improvement, if not cure, in the general and local condition. Great prudence must be exercised with the injections. A single drop should be injected to begin with, in order to avoid accidents, possibly of a grave nature.

A. ANTONELLI.

(3) In his seventh communication upon the action of jequirity in cases of cancer not amenable to surgical treatment, **Rampoldi**, of Pavia, insists upon the necessity of extreme prudence in the injection of the fluid extract of jequirity, since a tenth of a drop of the No. 5 extract of Zambelletti may suffice to cause very violent reaction, even in a robust adult, with a temperature reaching 40°C. The action of the toxi-albumin extract of the seeds of the *abrus precatorius* appears to be very variable in different organisms, other conditions remaining the same. The adaptation of the tissues to the poison is, on the other hand, rapid and considerable. Jequirity is particularly valuable in inoperable cases, in order to diminish suffering and to prolong life.

A. ANTONELLI.

(4) In a case of epithelioma of the lower eyelid, which had recurred seven years after operation, **Bialetti**, of Vigevano, applied three of the gelatine discs of jequirity, No. 2, prepared by Zambaletti. For three or four days the reaction was marked, as shown by ulceration where the discs had been applied, and considerable œdema of the eyelid and of the cheek. At the end of about ten days two discs were applied, and they were followed by a much weaker reaction. After twenty-five days all neoplastic material seemed to have been eliminated, and reparative processes had commenced. Finally, all that remained was a whitish cicatrix and a small symblepharon.

A. ANTONELLI.

(5) **Denta**, of Milan, concludes after the experience of eight cases of epithelioma of the eyelids treated by the application of gelatine discs of jequirity (Rampoldi), that by this means one really obtains an elective destructive action upon the morbid neoplastic elements, a stimulating action upon the normal repairing elements, of such a kind that elimination of the epitheliomatous nodules is assisted, and perfect cicatrization is brought about, and the tissues undergo a veritable *restitutio ad integrum*. A preliminary scraping of the diseased surface, before application of the discs, appears to lead to a more rapid and complete result. In comparison with the X-rays, jequirity has the advantage of not damaging healthy tissue and of acting much more rapidly.

A. ANTONELLI.

(6) **Farina**, of Brescia, makes an interesting contribution to Rampoldi's method, with details of six cases where very brilliant results were yielded by jequirity, especially in cutaneous epitheliomata taken in hand early.

A. ANTONELLI.

XVI.—SERUM AND VACCINE THERAPY IN DISEASES OF THE EYE.

- (1) **Rubbrecht, R.**—Blennorrhagic ocular metastases: treatment by antigonococcic vaccine. (*Métastases oculaires blennorragiques: Essai de traitement par le vaccin antigonococcique.*) *Bull. de la Société belge d'Ophthalmologie*, No. 27, 1909, p. 82.
- (2) **Fromaget, Camille.**—Tuberculous irido-choroiditis cured by tuberculin T.B.K. (*Irido-choroidite tuberculeuse guérie par la Tuberculine T.B.K.*) *L'Ophtal. Provinciale*, juin, 1910.
- (3) **Weeks, John E.**—Vaccine and serum therapy in ophthalmology. *Trans. Amer. Ophthal. Society*, Vol. XII, Part II, 1910, p. 598.
- (4) **Derby, George S.**—Vaccine and serum therapy in ocular tuberculosis. *Ibidem*, p. 614.
- (5) **Alexandroff.**—The serum therapy of ocular infections. (*Sérothérapie des infections oculaires.*) *La Clinique Ophthalmologique*, 10 octobre, 1910.
- (6) **de Schweinitz, G. E.**—Concerning the treatment of various forms of ocular tuberculosis and of corneal infections with vaccines or bacterins. *Therapeutic Gazette*, October 15th, 1910.
- (7) **Darier, A.**—Conclusions derived from our enquiry as to serum therapy in ocular infections. *La Clinique Ophthalmologique*, 10 décembre, 1910.

(1) **Rubbrecht**, of Bruges, made three injections of antigonococcus vaccine in a patient who suffered from systemic gonorrhœa, complicated with conjunctivitis and keratitis. The first injection contained five millions of gonococci; the second seven and a half millions; and the third ten millions. The result was excellent.

Since attention has been directed only during the last few years to gonococcal keratitis, it may be worth while to give a few details concerning that complication as present in Rubbrecht's case. When the conjunctivitis had been quite well for a few days, the left eye suddenly became painful, and, on examination, two infiltrated points were found alongside the lower nasal quadrant of the limbus. They had the size of a pin's head. They disappeared in the course of a few days without ulceration. A fortnight later, however, there was a slight recurrence of the conjunctivitis of the right eye, and the left eye was again affected with keratitis. Three infiltrated points, resembling those present on the first occasion, were seen towards the summit of the cornea, distant from one another by some 2 mm. and connected by a delicate, white tract. Two more spots appeared before long, and the lesion then formed a small chain disposed concentrically with the sclero-corneal limbus. There was intense photophobia, and the eye was watery and painful. There was no ulceration.

SYDNEY STEPHENSON.

(2) **Fromaget**, of Bordeaux, believes treatment by tuberculin to be free from danger, on condition that the principles established by von Hippel in 1905 are observed. Hippel regarded tuberculin as a poison to which the organism should become habituated by progressively ascending injections. Koch's tuberculin therapy lay in provoking local and general reaction. The new tuberculin therapy, on the contrary, consists in injecting extremely feeble doses, which determine no reaction, and in increasing the dose slowly, so that the temperature never reaches 38° C. Since this rule has been adopted, there have been many cures of ocular tuberculosis.

In the treatment of tuberculous affections of the eye, three kinds of tuberculin have been employed, T.R., B.E., and the Béraneck product. The last-named is sold in commerce in seventeen chief solutions, designated by letters or figures, or both, and each of these solutions is twice as strong as the preceding one. For example, A/512, A/256, A/128, A/64, and so forth. The feeblest solution is A/512 and the strongest, H. Béraneck's tuberculin is a mixed tuberculin containing both soluble and insoluble toxins. In order to obtain the latter, the endotoxins of the bacilli are extracted by treatment with 1 per cent. orthophosphoric acid. In this way there is no danger of injecting the bacilli.

Case.—A female, aged 28 years, whose family history was unimportant, had suffered from bronchitis in childhood, and at twenty years of age had been anæmic. Although thin, she presented no signs of visceral tuberculosis. Painful irido-choroiditis of the left eye, of three weeks' duration. V.=1/6. Fundus could not be seen, owing to opacities of cornea and vitreous. Ordinary treatment was tried for upwards of two months without result, although during that time most of the posterior synechiæ which existed were ruptured by the local use of atropine. Injections of T. B., made on four occasions in December, 1909, were accompanied by ocular reaction, and after the last one the temperature reached 38° C. During January and February, 1910, nine injections were made. Besides these, other injections appear to have been made, but when or in what number cannot be gathered from Fromaget's account of the case. Under the influence of the treatment, the irido-cyclitis got much better, the vitreous body cleared, and when the fundus could be examined with the ophthalmoscope, an atrophic lesion was discovered in the choroid. V.=1/3. It is to be noted, finally, that two months' treatment along the usual lines had failed to benefit the patient.

SYDNEY STEPHENSON.

(3) This extremely practical communication by **Weeks**, of New York, deals with the use of vaccines and sera in ophthalmology.

Immunization against a particular disease is brought about in two ways: first, by stimulating the tissues to produce antibodies, as by injecting vaccines ("active" immunization) or, secondly, by introducing ready-made antibodies

into the patient's system, as by injecting antisera ("passive" immunization). Both are specific only against the bacteria from which they are prepared. A vaccine made from the same strain of bacteria against which it is employed (*autogenic*) is more efficient than a vaccine made from other strains (*heterogenic*.) A vaccine compounded from a number of strains (*polyvalent or stock vaccine*) approaches more nearly in therapeutic value to the autogenic vaccine than one made from a single heterogenic strain.

Vaccines (Bacterins).

1. **Tuberculins.**—In ophthalmology these products are used for diagnosis as well as for treatment. Weeks believes that for positive evidence in the former a reaction must be obtained in the diseased eye itself. This can be satisfactory elicited only by the subcutaneous injection of tuberculin, a purpose for which the author employs Koch's original T.O. The exact method of procedure followed by him is given in detail. With respect to therapeutic value, Koch's original T.O. having been subjected to a temperature of from 70° to 90° during its preparation, it is less active than Koch's new tuberculin, T.R., bacillus emulsion, B.E. bacillus filtrate (Denys'), and B.F. The dose is approximately the same with each of the foregoing products. von Hippel's method (1/500 mgm. to 1 mgm., the dose being increased by 1/500 mgm. at each injection) is the plan of administration at present advocated by those of large experience. Its value in the treatment of ocular tuberculosis is now generally admitted. Weeks' own cases include 5 cases of sclero-keratitis (3 recovered and 2 improved), 1 case of conglomerate tubercle of the iris (recovered), 4 cases of choroiditis (4 improved), and 3 cases of keratitis (3 recovered).

2. **Gonococcic vaccine.**—As it is difficult to obtain autogenic vaccine, polyvalent vaccines must ordinarily be employed. Large doses are well tolerated, although the present tendency is to give smaller doses than formerly, ranging from 2,500,000 to 50,000,000. Many workers believe that for gauging the reaction of the tissues, the opsonic index is not of greater value than such clinical manifestations as the local and general reaction produced by the vaccine and its effect upon the course of the disease. Diagnostically, Weeks has not yet observed the indications described by Irons (*Journal of Infectious Diseases*, June 4th, 1908). Gonococcic vaccine has little value in acute gonorrhœal infection, either of the urethra or of the eye. As to chronic gonorrhœal affections of the eye, Posey reports a case of severe uveitis which received much benefit, and S. Hanford McKee three cases of metastatic gonorrhœal inflammation of the conjunctiva. Two cases of gonococcal iritis belonging to C. A. Oliver are also mentioned. A couple of cases of gonorrhœal iritis treated by Weeks with injections of gonococcus vaccine did well. It is interesting to note that gonococci could not be found in the plastic lymph recovered from the anterior chamber of one of these patients, although they could be found in the associated gleet.

3. **Streptococcic vaccine.**—The dose for intra-muscular injection recommended by Wright is 10,000,000 to 20,000,000, the minimum to be the initial dose. This vaccine may possibly be of value in cases of erysipelas affecting the eye.

4. **Staphylococcic vaccine.**—The staphylococcus, as well-known, is a factor in the production of eczematous processes of the eyelids, conjunctiva, and cornea, in some abscesses of the lids, in certain forms of marginal blepharitis, and, finally, in some suppurations of the eyeball after traumatism. Cases have been treated by staphylococcic vaccine by Duane, Todd, Oliver, Gradle, all with good results. It is rather curious that Weeks makes no mention of

the successful employment of staphylococcus vaccine by English surgeons, especially by H. Grey-Edwards, Ernest Maddox, Stephen Mayou, and Harold Grimsdale, whose experiences have been reported in *THE OPHTHALMOSCOPE* during the last few years. It is to be noted, however, that the author quotes the names of American surgeons only throughout his communication. That is probably the explanation of what would at first sight appear to be a somewhat serious omission.

5. **Coley's toxins.**—This product is a bacterin made up of a mixture of streptococcus pyogenes and bacillus prodigiosus. It has been employed in cases of sarcoma of orbit or antrum by Jack, de Schweinitz, Brandoux, Coley, and the writer.

Antisera.

1. **Diphtheria antitoxin.**—The initial dose of this product is 2,000 to 10,000 units, according to the severity of the infection. In ocular diphtheria two injections are often adequate. A third or fourth injection, however, may be given if necessary. Diphtheria antitoxin is being employed by Ramsay, of Glasgow, and by Lauber, of Vienna, in the treatment of affections of the sclera, cornea, and iris of non-diphtheritic nature. Weeks says that "the indications for such use of this antitoxin are not clear." The remark would almost lead one to believe that Weeks had never heard of Darier's famous "para-specific" therapy.

2. **Gonococcic serum.**—This serum is obtained from sheep some days after the injection of an emulsion of living gonococci into the peritoneal cavity (Rogers and Torrey), but it has been used with little or no benefit in cases of gonorrhœal conjunctivitis. The contrary is however the case in iritis, if we may judge from the four cases reported by Arnold Knapp (three cured and result indefinite in one).

3. **Streptococcic serum.**—The variable results obtained by this serum in affections of the eye by Bull, Ellis, Gibson, Greenwood, Lewis (E.R.), Rogers, Todd, Dennis, and Wilson (N.L.) are reported briefly.

4. **Tetanus antitoxin serum.**—That this serum is of value in the early treatment of tetanus is admitted by all who have either studied or employed it. Ellis had two recoveries in three cases of tetanus developing from the eye. Recovery followed the use of the serum in a case by Lewis.

5. **Flexner's serum.**—This product (meningitis antitoxin) might be of service in affections of the eye due to epidemic cerebro-spinal meningitis.

6. **Deutschmann's serum.**—This serum, as well known, is obtained from animals that have been fed upon ascending doses of living yeast cells. Two unsuccessful cases of the use of the serum in eye diseases are briefly mentioned. The opinion is expressed that the "serum is of doubtful value."

7. **Cytogenic sera.**—These products possess hæmolytic and hæmagglutinative properties, and are specific against the cells of the organs from which the inoculations were made. They date from a suggestion made by Dungern in 1899, *viz.*, the possibility of using an epitheliolysin for the destruction of epithelial cancer cells left in the patient's body after the surgeon's work. S. P. Beebe (*Journ. Experimental Medicine*, 1905, p. 733) isolated nucleoproteids from various tissues and produced antisera by injecting them into the peritoneal cavity of alien animals. Active sera were thereby produced. These methods were applied to the thyroid in the treatment of Graves' disease.

8. **Syphilis.**—The Wassermann reaction is undoubtedly of value in clearing up the nature of doubtful lesions of the eye. Butler (*Journ. Amer. Med. Association*, September 5th, 1908) is quoted as follows: "The serum

(Wassermann) reaction for syphilis is specific. It is found positive in from 60 per cent. to 85 per cent. of all cases with specific manifestations in 50 per cent. to 60 per cent. of latent cases in from 70 per cent. to 80 per cent. of parasyphilitic diseases." The Noguchi test (see THE OPHTHALMOSCOPE, 1910, p. 538) is spoken well of by Weeks.

SYDNEY STEPHENSON.

(4) **Derby**, of Boston, deals with vaccine and serum therapy in ocular tuberculosis. He begins by tracing the earlier experiments with Koch's tuberculin in 1891 and 1892, and, in doing so, points out why the remedy soon fell into disuse. The *coup de grace* appears to have been given by Koch's announcement, which was to the effect that his tuberculin was a toxin obtained by culture of the tubercle bacillus. So complete was the abandonment of the new agent in eye work that between the years 1893 and 1900 but a single communication appeared dealing with its therapeutic use in man. von Hippel may be called the father of modern tuberculin therapy in ophthalmology. In 1908 Allen made a point of the fact that infection with tuberculosis might be due either to a human or a bovine strain.

What is the best preparation to employ?—Derby answers the question by saying that probably good results may be obtained from all the standard preparations, although it is safer for beginners to employ the filtrates or solutions, such as Koch's old tuberculin, T.O., and those of Denys, B.F., and Béraneck, T.B.K. These products are more uniform in dosage and less likely to cause reaction than are the emulsions or vaccines T.R. and B.E. As yet we are not in a position to decide between the relative merits of human and bovine extracts. **Technique.**—A glass syringe of one c.c. capacity is preferable, on account of ease in sterilisation and measurement, and the injection should be made alternately on each side in the back below the scapula. Before the little operation, the skin is cleansed with ether or alcohol, and after it is completed, the puncture, if desired, may be sealed with collodion. **Dosage.**—The practice of using large doses of tuberculin at infrequent intervals should, in Derby's opinion, be avoided. On the other hand, Wright's school maintain that the administration of very minute doses, 1/100,000 to 1/10,000 mgm. of new tuberculin, repeated at long intervals and increased only to a slight extent under the control of opsonic index estimations, is the proper method of procedure. Derby proceeds as follows:—The initial dose should be small—T.O. 1/500 to 1/100 mgm.: B.E. and T.R. 1/1,000 to 1/500 mgm.: B.F. 1/10,000 to 1/1,000. (The author prefers the smaller dose in each case.) It should be slowly and carefully increased, and, as far as possible, all signs of reaction, whether local or general, should be avoided. When going from one solution to the next higher, the step should be gradual, *i.e.*, 9/10,000, 1/1,000 1.5/1,000, 2/1,000, etc. **Frequency.**—Four or five days is the average time between successive injections, but each case must be treated upon its own merits. Indeed, the interval must be controlled by careful and repeated observation of the temperature, by the pulse, by attention to the general health of the patient, and, whenever possible, by the state of the eye itself. **Miscellaneous points.**—Most cases of ocular tuberculosis may be treated as out-patients, but records of temperature, pulse, and so forth must be carefully recorded in a book kept specially for the purpose. The patients may be supervised in their own homes by health visitors. Derby again points out the advantages of establishing tuberculous classes in connection with eye hospitals for the treatment of ocular tuberculosis.

Finally, Derby tabulates thirty cases of ocular tuberculosis treated by tuberculin. The list includes 15 cases of sclero-keratitis, 9 cases of interstitial

keratitis, and 6 cases of kerato-iritis. On the whole, it may be claimed that the results are favourable, although in a number of the cases it is by no means certain that a cure would not have taken place as speedily without as with the tuberculin.

SYDNEY STEPHENSON.

(5) **Alexandroff**, of Ajaccio, who confesses that he had been a sceptic on the subject of serumtherapy, was startled into recognition of its value by the progress of a case under his care : a progress towards cure, apparently directly attributable to Roux serum, the equal of which he had not seen in thirty years of eye practice.

The patient, a woman, aged 42 years, consulted Alexandroff on account of an inflamed eye, with which was associated intense pain. The eye had been treated at home with instillations of human milk. There was a serpent ulcer of the upper part of the cornea, while the lacrymal apparatus was normal. From this the author concluded that the corneal ulcer had become infected by the milk. In spite of all the usual treatment, the eye went from bad to worse. Keratotomy being refused by the patient, she was given an injection of 10 c.c. of Roux serum. She did not appear next day, and Alexandroff gave up the eye for lost. On the day following the patient returned, having had the first night's sleep for twelve days. The eye was on the road to recovery, and this was completed by the administration of two further injections. Two years later she was found to have normal vision. Three other cases are given in detail: (1) infective conjunctivitis in which also human milk was the probable cause, (2) post-operative infection, (3) serpent ulcer with normal lacrymal passages, in all of which the results of injection of Roux serum were excellent and permanent. The author concludes that, "in certain eye infections, the nature of which will probably gradually be defined, para-specific serumtherapy is capable of giving remarkable results, results which are superior to those obtained by classical methods," and is forced to the conclusion, by an impartial study of these and some other cases, that if serumtherapy does not always lead to miraculous cures, it has never, in his hands, caused any trouble. Further, in all the cases treated and studied it has had a manifestly analgesic and comforting effect. It may be mentioned that Alexandroff always uses the anti-diphtheritic serum of Roux and never gives more than four injections each of 10 c.c.

ERNEST THOMSON.

(6) **de Schweinitz**, of Philadelphia, discusses the treatment of ocular tuberculosis and corneal infections by means of vaccines or, as he prefers to call them, "bacterins."

His two cases of ocular tuberculosis may be epitomised as follows :

Case No. 1.—A girl, aged 18 years, had suffered for eight years from a recurrent, painless inflammation of her right eye. When seen by the author, R.V. = fingers at 30 cm. The cornea showed interstitial opacities, and the sclera was injected, tumid, and gelatinous, and contained many yellowish nodules, of the size of a pin's head. Posterior synechiae and pigment on the anterior capsule of the lens. General examination negative, but the tuberculous nature of the eye lesion was inferred from (1) the positive reaction obtained with von Pirquet's test and by the injection of old tuberculin, and (2) the structure of the scleral nodules, which were made up of epithelioid and giant cells, although no tubercle bacilli could be found. "Old" tuberculin (H. K. Mulford Co.) was employed at varying intervals for a period of about six weeks. Marked improvement within a week, and at the end of two and a half months, the eye was practically well, with V. = 6/60.

Case No. 2.—A female, aged 36 years, had had suppurating glands removed from neck and groin. Later, the left eye was attacked by recurrent inflammation. The sclera, especially in its upper and outer expansion, was injected and tumid and showed scattered through it numerous, yellowish-white nodules of the size of a pin's head. There was a tongue-shaped infiltration at the outer side of the cornea. An extremely active reaction, both general and local, followed a diagnostic dose of tuberculin (Marietta Farm product). The same tuberculin was now given on alternate days, the initial doses being 1/50th mgm. and a dose of 2 mgm. being eventually reached. Even the smaller doses always produced a moderate reaction. Symptoms after becoming quiescent, however, recurred. de Schweinitz, commenting upon the case, lays stress upon the importance of injecting such doses of tuberculin that signs of reaction, either general or local, do not manifest themselves during the treatment.

When satisfied of the tuberculous nature of a lesion of the uveal tract, cornea, or sclera, the patient's temperature should be taken three times a day for three days prior to the commencement of the special treatment. An active tuberculin—as, for example, "T.R." or a bouillon filtrate—should be selected, and small doses should be given at first. Injections should be repeated every second or third day, according to results, never forgetting that the object is to increase the dose to what the patient can tolerate without showing reactional signs.

In the last case described by de Schweinitz, hypopyon-keratitis, due to the streptococcus mucosus, was treated with bacterin prepared from the lesion. Despite the use of pure carbolic acid, hypopyon increased in quantity and the ulcer extended. The anterior chamber was then opened, the pus removed, and the anterior and posterior chambers were irrigated with physiological salt solution. Of a bacterin prepared from the streptococcus mucosus, the patient received three injections, the first containing 50,000,000 cocci, the second (five days after), 100,000,000 cocci, and the third (four days later) 100,000,000 cocci. Improvement was noted after the first injection, and continued rapidly after those which followed. Eventually, V. = hand-movements, cornea clear except in region of ulcer, which was occupied by a dense scar, giving rise to a little flattening in the upper part of the eyeball. Iridectomy will probably improve sight still further.

de Schweinitz in speaking of Römer's antipneumococcus serum, admits its curative powers, but goes on to say that "as prepared at the present time its action is not sufficiently certain to allow it to replace other methods." The author believes that the injection of the bacterin had much to do with the recovery of his own case. As more than one method of treatment was employed, however, credit must be divided. de Schweinitz incidentally mentions a case of gonorrhœal iritis which received great benefit from injections of Neisser bacterin. Three injections were given, containing, in all, 300,000,000 organisms. But such large doses, as shown by a recent case by Weeks, are not necessary.

SYDNEY STEPHENSON.

(7) In an article extending to thirty-two pages, **Darier**, of Paris, gives the results of the enquiry made through the columns of *La Clinique Ophthalmologique* as to the value of serumtherapy in eye diseases. The conclusions arrived at are partly in the form of references to literature, with the essential details stated, and partly in the form of Darier's own deductions from these and from his own large personal experience with this method of treatment.

The article is essentially an exposition of the value of what is called "para-specific" as opposed to "specific" serumtherapy, and more particularly of the value of the serum of Roux—a serum which, in contradistinction to some others, can be obtained anywhere and everywhere. The serum of Roux-Behring, of course, acts specifically on diphtheritic conjunctivitis. With this exception, if we rightly grasp the author's meaning, paraspecific or non-specific serumtherapy is destined to render more real service than the anti-rheumatic serum of Rosenthal, the anti-streptococcic serum, or the anti-pneumococcic serum of Roemer.

A three years' experience has shown that, taken by the mouth, a serum [? this serum.—E.T.] has exactly the same inhibiting effect on many infective ocular processes as when injected, but when used in this way does not lead to "serum accidents." The author believes that immunising sera taken by the mouth do not act as bactericides, but act only by their property of stimulating organic resistances after the fashion of defensive serum opotherapy (*opothérapie sérique de défense*).

As the result of the enquiry it is found that in the majority of ocular

infections the result is the same whether one employ the serum of Roux, anti-tetanic serum, anti-rheumatic serum, or Deutschmann's serum. The mass of clinical facts imposes on us the conclusion that it is necessary to establish as a corollary to Pasteur's law on the specificity of sera that "*Every anti-toxic serum, in addition to its specific action on the disease against which it has been prepared, possesses the property of bringing to every organism invaded by any infective agent some elements of general defence capable of neutralizing or of attenuating to a greater or less degree the majority of the morbid symptoms caused by the said infection.*"

The enquiry has covered the following infections: (1) pseudo-membranous conjunctivitis; (2) infective corneal ulcers; (3) parenchymatous and scrofulous keratitis; (4) iritis and iridocyclitis; (5) traumatic and (6) post-operative infections; (7) influenzal neuro-retinitis; (8) sympathetic ophthalmitis; (9) ophthalmic zona; (10) dacryocystitis; (11) abscess of the orbit, facial erysipelas, and impetigo.

So many articles and abstracts of articles dealing with the value of paraspecific serumtherapy have already appeared in THE OPHTHALMOSCOPE and other journals that one cannot well devote space to details of the various results here brought together. The enthusiastic champion of the method claims that while it is no infallible panacea, the administration of the Roux serum (preferably) in any infective process, and by the mouth if there is any difficulty as regards injections, powerfully reinforces the defensive mechanism of the tissues and acts as a vascular tonic which aids the organism in its resistance to the progress of infection. If the infection be too far advanced or too virulent, nothing will stop it. Failure of paraspecific serumtherapy is most frequent in grave infections of the non-vascularized tissues of the vitreous and cornea. Its greatest chance of success is when it is employed early in an acute infection, and *other methods of treatment must by no means be neglected.* In any case, it does no harm. We may conclude this *résumé* of a very interesting, if rather loosely arranged, review with the following quotation:

"In iritis, acute iridocyclitis, and phlegmon of the lacrymal sac the action of serum is often surprising. He who on his first attempt at serumtherapy happens upon a good-going acute iridocyclitis (*iridocyclite à grand fracas*) which resists dionin, atropin, salicylate, leeches, and paracentesis, and who then reaches calm water a few hours after the administration of serum may quite easily be inclined to over-enthusiasm in the use of this therapeutic agent."

ERNEST THOMSON.

BOOK NOTICES.

Nursing in Diseases of the Eye, Ear, Nose, and Throat. By THE COMMITTEE ON NURSES OF THE MANHATTAN EYE, EAR, AND THROAT HOSPITAL. Philadelphia and London: W. B. Saunders Co. 1910. Price \$1.50 net. 281 pages. 81 illustrations.

This is a well-written book prepared by no less than seven individuals. In the preface it is stated that "a practical difficulty in the preparation of such a book arises from the fact that the preliminary education of nurses varies so greatly." We imagine that another practical difficulty has been that the nursing requirements in ophthalmology are considerably different from those of the other specialties with which the book deals. It is said that "too

many cooks spoil the broth," and presumably that is why the culinary result is, in the present instance, unsatisfactory in many respects.

It is possible that to the nurse who is already highly trained, and whose critical faculty is awake, the book may prove of service in reminding her of many things; but to the probationer, or partially trained nurse, it will, in our opinion, be of comparatively little service.

The first portion of the book, under the title "General Part," deals with antiseptics, disinfection, sterilization, preparation of the operating room, nurses' duties, the management of troublesome children, and the feeding and care of infants. It contains a great wealth of information on these subjects, yet there is no separate chapter on the preparation of the patient for operation. We have been unable to find anything in detail about urine or micturition, or about the keeping of case records. Worst of all, there seems to be no mention of the necessity for an empty stomach in general anæsthesia. This last omission, and probably other omissions in matters of detail, so far as these may be unintentional, may be the fault of the joint authorship.

In the part of the book dealing with the eye, we find the same want of balance. There are twelve pages of anatomy, twenty-five pages on common remedies and their application, including the use of heat and cold, seven pages on the handling of eyes and the application of ointments and drops, a chapter which—*absit omen*—includes "contagious diseases" and "the nurse's duties at operations," and a chapter, with numerous illustrations, on eye instruments and appliances. In spite of all this useful information, there is nothing about the after-care of eye operation cases, no hint as to the significance of pain, as to post-operative mental disturbance, as to retention of urine, and so on. It is hardly possible to doubt that such omissions as these are intentional omissions, and that the book may fulfil the requirements of the authors, but we do not hesitate to express the opinion that a manual which is so elaborately detailed, and yet so singularly incomplete, is hardly likely to make a favourable appeal to those in charge of eye patients in this country.

With the chapters on ear, nose, and throat we do not intend to deal.

E. and K. I. T.

Glaucoma: an inquiry into the Physiology and Pathology of the Intra-ocular Pressure. By THOMSON HENDERSON, M.D. Illustrated. Pp. 222. London: Edwin Arnold, 1910. Price 10s. 6d. net.

This treatise comprises the work for which the author received the de Vincentiis medal at the International Ophthalmological Congress at Naples, in 1909. Most, if not all of it, has been published in the form of communications to THE OPHTHALMOSCOPE and other journals, but we have now an opportunity of studying the various researches in their relation to each other and to the theory of glaucoma.

Of the 120 pages more than one-half are devoted to the anatomy of the ciliary region and the physiology of the ocular pressure and circulation. The rest of the work deals with the application of these considerations to the problems of the ætiology and mechanism of glaucoma, and the *rationale* of its treatment. The following may be given as a summary of the more important conclusions arrived at:

The *ligamentum pectinatum iridis* does not arise from the splitting up of Descemet's membrane, is not comb-like in structure, and is not a ligament of the iris, nor does it terminate in the root of the iris. It originates as a continuation of the inner lamellæ of the cornea, is composed of regularly disposed interlacing fibres, and for the most part forms the ligament of origin

of the ciliary muscle. It is, at birth, a cellular structure, which undergoes progressive sclerosis with advancing years, until it ultimately becomes entirely fibrous. Henderson suggests the substitution of the name *cribriform ligament*, as a more appropriate designation. The open network of the normal ligament allows the aqueous direct access to Schlemm's canal and the suprachoroidal space, as well as to the interstitial spaces of the inner corneal lamellæ. Sclerosis of the ligament creates an increasing obstruction, which predisposes to glaucoma by impeding the access of the aqueous to Schlemm's canal and the suprachoroidal space. Through the crypts of the iris the aqueous has direct access to the iris veins. The *circulus arteriosus iridis major* is not an arterial vessel, but, like the canal of Schlemm, a venous sinus, and is closely related to the latter. The venous system of the uvea may be described in two portions, *viz.*, the anterior uveal veins draining the iris and ciliary body, perforating the sclera, as they do so anastomosing with each other and with Schlemm's canal, and finally dividing up to form the superficial corneal plexus; and the posterior uveal veins, or *venæ vorticossæ*, draining the choroid. The channels normally available for aqueous resorption are the canal of Schlemm, the veins of the iris, and the anterior uveal veins as they cross the suprachoroidal space.

The author's conception of the mechanism of the intraocular pressure is based on the discovery by Leonard Hill that the intracranial pressure is equal to, and varies directly with, the cerebral venous pressure, and the fact demonstrated experimentally that the intraocular pressure is equal to the intracranial pressure, and that they rise and fall together. He discusses in detail the points of resemblance between the eye and the cranium, and concludes, with regard to the eye, that the corneo-scleral envelope is a rigid case whose contents have a fixed volume. Intraocular pressure is therefore not a matter of volume or of balance between inflow and outflow of ocular contents, but, like intracranial pressure, is vascular in origin, and is equal to the venous pressure in Schlemm's canal, that being the lowest venous pressure in the eye to which the aqueous has access. Intraocular pressure varies directly, and millimetre for millimetre, with the general venous pressure, but only relatively with the general arterial pressure. The aqueous does not come from the so-called ciliary glands, but is secreted by the cells lining the apices of the ciliary processes, and it passes into the anterior uveal veins by an active process of resorption. Neither the inflow nor the outflow of aqueous is a passive filtration. The cornea is nourished by aqueous diffusing through the origin of the cribriform ligament, and this fluid is resorbed by the superficial pericorneal venous plexus. The tension of the corneo-scleral tissue fluids varies with that of the intra-ocular fluids.

Thomson Henderson's theory of the mechanism of glaucoma, based on these physiological considerations, may thus be summarised in the author's own words:—"The free contact between aqueous and veins causes the intraocular pressure to be maintained at the normal intra-venous level, as this is the lowest circulatory pressure. In glaucoma, the contact is diminished, and the intraocular fluids, being contained in an unyielding capsule, act as a rigid volume, which, operating through the tissues, compels the intra-ocular circulation to run in rigid lines. In a rigid system the outflow pressure is always higher than in a similar system of elastic tubes. In glaucoma, the lowest circulatory pressure is that in a rigid system, and therefore the intraocular pressure is maintained at a correspondingly high level." In primary glaucoma there are two factors: (1) a constant, predisposing one, in the form of sclerosis of the cribriform ligament, (2) an exciting cause, which is vascular. The first alone will not cause glaucoma, as long as the aqueous has

sufficient access to the iris veins, and the vascular factor remains in abeyance. Variations in general vascular pressure have no effect in the absence of sclerosis of the cribriform ligament. The predominance of one or other of these factors determines the type of glaucoma. In the acute congestive form the vascular factor preponderates, while in the non-congestive form it is a subordinate feature. Secondary glaucoma may also be of obstructive or of circulatory origin. The elevated tension of cyclitis and intraocular tumour is of vascular origin, a rise of intraocular blood pressure being induced by the local process, and leading in turn to rise of intraocular pressure. In other cases with *exclusio* or *seclusio pupillæ*, the rise of tension is obstructive, being due to diminished access of the aqueous to the veins. Glaucomatous cupping of the disc is thus explained.—The pressure within the globe, suprachoroidal space, optic nerve sheath, subdural space, and brain, all stand at the same level. The lamina cribrosa, therefore, under normal conditions, does not require to support any pressure. In glaucoma the intraocular pressure is raised independently of intracranial pressure, and the lamina cribrosa is forced back by the greater pressure on its anterior aspect.

As to treatment, the beneficial results of iridectomy are due to the fact that the cut edges of the iris do not cicatrise, but allow of free passage of aqueous into the iris stroma, and thus into contact with iris veins. This compensates for the restriction caused by sclerosis of the cribriform ligament. Myotics act by contracting the pupil and so opening up the crypts of the iris, provided that the iris has not become sclerosed and atrophic.

The task of the reviewer of such a work as this is not an easy one. The author boldly sets out to demolish accepted views and to erect a theory of his own in their place, and the reader feels that he is expected to play the rôle of defender of the old faith, or, at least, of an arbiter between the claims of the old and the new. To do so in an adequate manner would take us beyond the limits of this notice, but no doubt the work will receive the attention it merits from those qualified to speak on the subjects with which it deals.

In the sections dealing with the anatomy of the angle of the anterior chamber and the histology of the glaucomatous cup, the author does well to direct attention to the fallacy of basing description on the examination of single sections, and the importance of studying serial sections for this purpose. This part is convincingly written, and will, we fancy, be found to be correct in its essential features.

The reader's difficulties begin when he comes to the physiological and pathological sections of the book. So far as one can gather, the author's views are based on the experimentally demonstrated facts that the intraocular and intracranial pressures are identical, and that the latter is equal to intracranial venous pressure, and, further, on certain phenomena manifested by his model, which consists of a sealed glass flask filled with water, through which passes a rubber tube carrying a flow of water to represent the intraocular circulation. A good deal of space is naturally devoted to the discussion of the ocular pressure and circulation, but one is often at a loss to see how the author's premises justify his conclusions. Take, for example, the following paragraph: "The experimental demonstration that the intraocular pressure stands at the same level and varies with the intracranial pressure, which latter in its turn is the same as the intracranial venous pressure, proves that *the intraocular pressure must be the same as the intraocular venous pressure*. Further, however, as the pressures within the cranium and eyeball are the same in origin, nature,

and level, therefore their enclosing coverings must be similar in nature, so that the fibrous corneo-scleral envelope represents an unyielding case with a fixed cubic capacity analogous in every respect to the bony cranium." Does not this involve the fallacy of *petitio principii*?

With regard to the flask model, it is easy to forget that a model, like a diagram, can only serve to illustrate a conception of what occurs. It cannot fairly be used to *prove* a theory, although the author, in his enthusiasm, claims that the conditions in his model are 'exactly the same' as those in the eye.

Another difficulty meets us when we come to the discussion of the mechanism whereby the balance between the ocular pressure and intraocular venous pressure is maintained. As a rule, the writer tells us that the ocular pressure has no relation to the volume of the ocular contents, but rises and falls with the pressure in the intraocular veins, pressure being transmitted from aqueous to veins or *vice versa*, in virtue of the direct contact of aqueous with the elastic walls of Schlemm's canal and the veins of the iris. But on page 94 there is an account of the readjustment of aqueous pressure by the draining away of aqueous through the cribriform ligament and iris crypts into Schlemm's canal and iris veins. Does this mean that the author has not been able to shake off every trace of the 'volumetric' theory, or is it an integral part of his own theory? Throughout the book such phrases as "diffusion," "osmosis," "resorption," "absorption," and "displacement of aqueous," and "transmission of pressure through direct contact of aqueous with vein walls," or "access of aqueous to veins," seem to be used in reference to the same phenomenon, and as if they were synonymous. This loose use of terms is very confusing to the mind of the reader. Again, one has found it extremely difficult to grasp the precise meaning of the writer where he explains the rise of intraocular pressure in glaucoma on the ground that the circulatory conditions are converted into those present in a rigid system of tubes.

In the section on treatment, he returns to the attack on the filtering cicatrix, which is not 'physiologically feasible,' and since the volumetric theory of intraocular pressure is incorrect, he holds that the whole theory of the filtering cicatrix falls to the ground. Whether or not the theory of the filtering cicatrix fails, surely there is abundant evidence that the filtering cicatrix itself is not a myth, and if Henderson's theories are correct, and the filtering cicatrix is a fact, we need not despair of reconciling them. Is it not possible, for example, that the filtering cicatrix, like iridectomy, may act 'by increasing the area of contact between aqueous and veins,' the veins in this case being, perhaps, those of the superficial pericorneal plexus?

There are many other interesting points which might be referred to, but enough has been said to indicate that a most careful reading of the book leaves the impression that the author's assumptions are too numerous and too sweeping, and that there is a certain vagueness and want of precision in the use of terms which are of the greatest importance in defining his position. These objections might be overcome in future editions, or in further work on the subject, if all important statements were supported by reference to the original sources, or by fuller details of the experimental and other *data* on which the conclusions are based.

In saying so much, one has no desire—indeed, one has no right—to question the validity of the author's main conclusions. The theory he puts forward is an attractive one, and will, if established, have an important influence on many aspects of ophthalmology besides the problems of glaucoma.

Whatever theory may ultimately prevail, one does not hesitate to say that this is a notable contribution to the literature of glaucoma, and one which nobody interested in the subject can afford to overlook. A. J. BALLANTYNE.

The treatment of syphilis by the Ehrlich-Hata remedy—"606." A compilation of the published observations by DR. JOHANNES BRESLER. Translated by DR. M. D. EDER, with an abstract of the most recent papers. London and New York: Rebman, Ltd., December, 1910. Price, 2s. 6d. net.

This little book of 122 pages (with three crude diagrams) has been published at a timely moment, when the famous "606" preparation is on the point of being made available for use by practitioners in all parts of the world. It contains a collection of observations upon the Ehrlich-Hata remedy published in various German periodicals. Dr. Eder, who is responsible for the translation of Dr. Bresler's book, has brought the abstract of papers to as recent a date as October, 1910, and has included references to several English communications.

The now world-famed preparation ($C_{12}H_{12}O_2N_2As_2$), discovered by Professor Ehrlich and tried on animals by Dr. Hata, was first experimented upon in man by two psychiatrists, Drs. Alt and Hoppe, of Uchtspringe, Altmark. The buttocks were first rendered anaesthetic by an injection of eusemin, and a neutralised suspension of the Ehrlich-Hata preparation was then injected deeply into the gluteal muscles. Twenty-three patients, mostly paralytics, were treated by a single injection of 0.3 gramme of "606." After the injection, pain was not uncommon, but it disappeared in most instances after twelve to twenty-four hours; temporary increase of temperature (never exceeding $38.8^{\circ}C.$), together with headache and vomiting, was sometimes observed. Neither infiltrations nor abscesses were seen. Among eighteen patients with a positive Wassermann reaction, two lost it completely, two showed marked decrease, and two a recognisable diminution. Alt's experiences sufficed to demonstrate that a dose of 0.3 gramme was *tolerata efficiens*. Dr. Schreiber, of Magdeburg, next experimented with the remedy in early cases of syphilis. The most startling results were reported. Primary sores, ulcerated throats, maculo-papular rashes, labial ulcerations, and some other early syphilitic manifestations faded away under the influence of "606" almost as if by magic. "The specific influence of a single injection," to quote from the report made by Alt (who had suggested the use of the remedy to Schreiber) "is quite incontestable." These results were confirmed and amplified by Wechselmann, who treated 80 cases by intra-gluteal injections of the new remedy. Some of the cases described by Wechselmann read almost like a romance. Remarkable results were obtained in cases which appeared to be hopeless, and which had been treated in vain for years by the usual remedies. Meanwhile evidence accumulated, the net result of which went to prove that in the Ehrlich-Hata medicament we possessed a remedy for syphilis of great potency and virtue, and one which was apparently devoid of serious drawbacks. In this estimate physicians, dermatologists, and psychiatrists were practically unanimous. Under its use the spirochaetes disappeared within twenty-four to forty-eight hours, while the Wassermann re-action frequently became negative. The Herxheimer reaction—i.e., reddening and swelling of any eruptions that might be present—occurred within twenty-four hours.

Does the new remedy, like atoxyl, exert any harmful influence upon the optic nerve? In reply to a correspondent of the *Berliner Tageblatt* (August 13th, 1910), Ehrlich stated that no case of blindness had been recorded among the 4,000 patients treated with arseno-benzol up to that date. Again, Wechselmann saw no injury to the optic nerves in a few patients whose

optic nerves were already affected, treated with the remedy. Beyond saying that so far no evil effect is known to have been produced, even although looked for, it is perhaps impossible as yet to go.

Scattered through Dr. Bresler's book are references to the employment of arseno-benzol in some specific affections of the eye. For example, Wechselmann (p. 12) mentions a successful result in a case of optic neuritis, and Michaelis (p. 19) a patient who, besides a generalised papular rash, had "small nodules on the eye." Neisser (p. 21) found that a single injection of "606," *together with the internal administration of potassium iodide*, caused the disappearance of choked disc, paralysis of several of the eye muscles, and tormenting headaches. Treupel (p. 47) saw slow recovery, with repeated exacerbations, follow the intra-muscular injection of 0.4 gramme of arseno-benzol in a case of iritis and keratitis due to inherited syphilis. On the other hand, Neisser (p. 67) speaks of there being no action in cases of specific interstitial keratitis. Igersheimer (p. 88), too, found that interstitial keratitis was not influenced by the drug, although there was a change in the Wassermann reaction within four days after injection. Lange (p. 75) saw improvement in an instance of immobility of the pupil and paresis of the abducens. Ehrlich (p. 77) states that arseno-benzol influences very favourably "the tiresome gummatus disease of the iris." In one case of optic atrophy Igersheimer (p. 89) obtained no success from injection of 0.5 gramme of "606." Michaelis (p. 107) had a good result in four cases of choked disc. Dr. E. v. Grosz (whose experiences have already been noticed in THE OPHTHALMOSCOPE, 1910, p. 907) strongly recommends arseno-benzol in cases of syphilitic eye disease, but thinks that it should not be employed in so-called simple atrophy of the optic nerve. In a recent communication (October 31st, 1910) Treupel reported a case of mydriasis unimproved by the Ehrlich-Hata remedy.

Finally, it may be mentioned that Spiethoff (p. 101) saw certain eye symptoms follow the injection of arseno-benzol. Among these were loss of sight lasting some minutes in a tabetic subject fifty hours after injection; ptosis and loss of sight lasting ten minutes, eight weeks after injection; and entoptic scotomata when the patient first stood up after the little operation.

SYDNEY STEPHENSON.

Notes and Thoughts from Practice. By W. J. TYSON. John Bale, Sons, & Danielsson, 1909. Price, 2s.

In this little *brochure* Dr. Tyson, Physician to the Victoria Hospital at Folkstone, "puts down his thoughts" after some twenty years of practice.

The first chapter is headed clinical studies, treating of prognosis in heart disease, the soporific action of mercury, the danger of confining old people to bed, and kindred subjects. Then follows a chapter on the fresh-air treatment of chest diseases, the use of sour milk, and the employment of saline enemata in acute diarrhoea. The third chapter deals with broad lines of treatment. Ten pages are devoted to ophthalmic notes in medical practice.

Dr. Tyson, who is evidently interested in ophthalmology, has been accustomed to see a few eye patients when he had finished his medical work at the Hospital. We cordially agree with him that there is something radically wrong with the way students are taught eye work at the teaching hospitals. He would have the programme more select and thorough. Every medical man, he thinks, should be taught the leading facts about common eye diseases, and these should be thoroughly impressed upon him and clinically illustrated. He should be well grounded in the differential diagnosis between iritis, conjunctivitis, and glaucoma, three diseases which are constantly confused by the general profession, with serious damage to patients. Dr. Tyson

impresses the necessity of a careful estimation of the refraction in cases of headache, and advises the full correction of myopia. We are unable to agree with him that myopia is due to compression of the eye by the superior oblique muscles acting during convergence. No rise of tension has ever been detected, caused by contraction of the intrinsic or extrinsic muscles of the eye, real high tension rarely causes myopia, and high myopia is frequently unilateral. Nor can we agree that a full correction of anisometropia cannot be worn. Generally, a difference of considerably more than 1 D. is easily tolerated, after the initial discomfort has been overcome. The diagnosis of glaucoma is hardly as simple as the author would imagine. In some cases it is almost impossible to decide whether an inflamed eye is affected with iritis complicating glaucoma or glaucoma secondary to iritis; and in others a prolonged examination with the scotometer will alone enable glaucoma simplex to be accurately diagnosed. We are bound to protest against the statement that half the cases of iritis, vitreous disease, choroiditis, and retinitis may be ascribed to syphilis. In hospital practice this estimate may be approximately correct, but in private work syphilis is not so common. The influence of septic mouths, intestinal stasis, and tuberculosis is of far greater importance. The seven lines given to kidney diseases (under *Ophthalmic Notes*) require revision from the standpoint of grammar. The first sentence is very awkward; the second could not be analysed. Dr. Tyson says that he has had no difficulty in getting a tobacco amblyope to abandon his drug. Our experience is exactly the reverse. We constantly find that the threat of blindness is quite ineffective in breaking the habit, and that a considerable number of patients never recover their lost vision. In this connection we notice no mention of the importance of a routine examination of the nose in cases of retro-bulbar neuritis.

The chapter on Food and Exercise is worthy of most careful study. Dr. Tyson takes a very sane view of diet, and deprecates any form of "faddism" in food.

The concluding chapters on Classification of Disease, upon the Prevention of Appendicitis, and upon Future Lines of Treatment are excellent.

We do not suppose that Dr. Tyson intended his little work as an addition to medical literature, but we sincerely hope that he obtained as much pleasure in writing the book as we have done in reading it. It is to be hoped that others of our mature provincial physicians will follow Dr. Tyson's example, and commit the fruits of their long experience to paper. It is very doubtful, however, if a general physician is spending his time profitably when he writes about such a very specialised subject as ophthalmology; we can scarcely imagine that an ophthalmic surgeon's "thoughts" upon pneumonia or gastric ulcer would be sufficiently valuable to be printed or read.

T. HARRISON BUTLER.

Transactions of the Ophthalmological Society of the United Kingdom.

Volume XXX, Fasc. 3, 1910. London: J. and A. Churchill, 7, Great Marlborough Street. Price 4s. net.

The third fasciculus of the thirtieth volume of the *Transactions* reached us on December 17th last; that is to say, some five months after the close of the session. *Festina lente* is evidently the motto of those responsible for the appearance of the publication. The present fasciculus contains 117 pages of scientific matter, together with index, report of Council, etc.

Appended is a good general index (the work of Messrs. A. L. Clarke and C. R. Hewitt), dealing with Volumes XXI to XXX, covering the years 1901 to 1910.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

THE FILTRATION ANGLE OF THE HUMAN EYE.

To the Editor of THE OPHTHALMOSCOPE.

SIR,

The evidence offered by Professor Arthur Thomson, of the University of Oxford, in his communication on the "Gross Anatomy of the Filtration Angle of the Human Eye," in the September issue of THE OPHTHALMOSCOPE, is, for obvious reasons, of very great interest and importance to ophthalmic surgeons in various functional and organic changes of the eye, where an operation is involved in the region described, and its vicinity.

Professor Thomson welcomes the evidence which may be offered in confirmation of his views, and anticipates that the subject has not entirely escaped the notice of those who have devoted so much time and labour to the elucidation of the anatomy of this region. Hence, I trust I may be allowed to mention that in confirmation of his views, as I have read his article with much pleasure and consulted some of the works on anatomy and ophthalmology, I find the following in support of the facts so beautifully illustrated by him in his photographic enlargements.

In anatomical text-books, the conditions described in figures 1 and 2 of his article in p. 609, are certainly the rule; but on looking over two out of the three works on ophthalmology which I have at present in hand, two diagrams with reference to the points he has raised (the club formation and thickening of the cornea at the corneo-sclerotic junction; the particular recess and groove formed at the filtration angle which is overhung by this thickening, and the thinness of the iris at the attached border where it becomes confluent with the fore part of the ciliary processes) are given in illustrations, but omitted from the text in any way of a minute description. But in a recent work on the subject, the study of the minute anatomy and physiology of the filtration angle and its boundaries is very clearly, though not minutely, entered into. It also shows diagrammatically as well, the circulation of the intraocular fluid, which is of such great importance to ophthalmic surgeons in operating in the vicinity of this region for glaucoma or cataract.

My only regret in looking at the enlarged photographs (figures 4, 5, and 6) on p. 610 of Professor Thomson's article is, that he has not been able to indicate the exact points of opening of the canals of Petit and Schlemm respectively, together with the spaces of Fontana and the "circumlental space," to which so much importance has of late been attached, owing to the theory of Priestley Smith that this space, if obstructed, enters largely into the production of glaucoma. Being a most important region, from the ophthalmological aspect, it is hoped that its anatomy and physiology, from the point of view of the circulation of the intraocular fluids, will receive greater attention.

It could hardly be expected of Professor Thomson to give in his enlarged photographs, which are intended to illustrate his points with regard to the "gross anatomy" of the filtration area, the *minute* anatomy I have referred to above. But owing to the two chief theories of the production of glaucoma—

namely :—(1) that it is due to inflammatory changes in the beginning, (2) that the attack is purely mechanical and produced by pressure, while the inflammatory changes are secondary—I feel it is a point which must be settled ultimately in the manner as suggested from the photographic enlargements by Professor Thomson, from the anatomical, as well as the physiological and pathological, point of view. These can only be depicted by the conditions of the normal and the pathological anatomy of the eye from enlarged photographs. But, at the same time, it would be essential to show the exact positions of the above-named canals in these two conditions to show their combined and relative actions in connection with the circulation of the intraocular fluids and the said pumping action of the iris, which Professor Thomson claims is the case.

Yours etc.,

G. H. FINK.

Major (Retired) I.M.S.

QUEEN'S GATE CHAMBERS,
52A, CROMWELL ROAD,
SOUTH KENSINGTON, S.W.
September, 1910.

NOTES AND ECHOES.

Deaths.

WE regret to announce the death on December 5th, of Peter Stephen, F.R.C.S. Edin., for many years consulting surgeon to the Dundee Eye Institution. Dr. Stephen, who was retired from practice, was 81 years of age at the time of his death, which followed a prolonged illness. He was unmarried.

From America the deaths are announced of Dr. Thomas D. Edwards, of Union City, Tenn., and of Dr. Edmund W. Stevens, of Denver, Colo.

* * * *

Appointments.

Mr L. VERNON CARGILL has been appointed senior ophthalmic surgeon to King's College Hospital, London, in succession to Mr. Malcolm McHardy, resigned. Mr. H. W. Lyle has succeeded Mr. Cargill as assistant ophthalmic surgeon to the same institution.

Mr. R. Russell Thomas has been appointed honorary ophthalmic surgeon to the Cardiff Infirmary, in succession to H. C. Ensor, deceased.

Mr. A. H. Payan Dawnay has been appointed honorary ophthalmic surgeon to the Schools of the London Society for Teaching and Training the Blind.

Dr. Robert Salus has been recognised as *privatdozent* of ophthalmology in the German University of Prague.

Dr. Otto Kuffler has been recognised as *privatdozent* of ophthalmology in Giessen.

Dr. Edmund Burwell has been appointed ophthalmic surgeon to the City Hospital, Seattle, Washington.

Dr. Clarence Loeb has been appointed ophthalmic surgeon on the staff of the new clinic established in South St. Louis by the St. Louis University.

* * * *

Honours.

THE title of professor has been bestowed upon Dr. Arthur Brückner, of Königsberg.

* * * *

D.O. Oxford.

IT is officially announced that the next examination for the diploma in ophthalmology of the University of Oxford will commence on Monday, July 17th, 1911.

* * * *

Mr. Wainewright's Will.

MR. BENJAMIN WAINEWRIGHT, of 104, Park Street, Grosvenor Square, W., consulting ophthalmic surgeon to the London Medical Aid Society, late surgeon to the Royal Westminster Ophthalmic Hospital and to the Charing Cross Hospital, who died at Pontresina, Switzerland, on August 28, aged fifty-seven, left estate in the United Kingdom valued at £114,478 gross and £47,021 net.

* * * *

How are the
Mighty Fallen.
official post-card.
hoped!

THE ordinary meeting of the Ophthalmological Society arranged for December 8th last was abandoned "owing to lack of support," to quote the *naïve* words of the Amalgamation is evidently nearer than some of us had

* * * *

Professor von Reuss.

VON REUSS has recently celebrated his twenty-fifth anniversary as ophthalmic surgeon in the University of Vienna. Congratulations!

* * * *

The Eye and Ear
Clinique.

SOME three or four years ago an institution, called at various times the National Eye Hospital, the National Eye, Ear, Nose, and Throat Hospital, and, more recently, the Eye and Ear Clinique, was established at 123, Oxford Street, W., and at the May meeting of the General Medical Council Mr. James Forrest, M.B., B.S. Edin., was charged with having associated himself, as a member of its committee and also as one of its surgeons, with this institution, which advertised by pamphlets and in the public press for paying patients. The complainants were the British Medical Association, and the fact that patients applying to the Clinique were charged half-a-guinea for the first attendance and five shillings for each successive attendance, and that the institution had been advertised by means of pamphlets and advertisements in the Sunday papers did not appear to have been denied. The Medical Secretary of the British Medical Association Mr. Smith Whitaker, submitted that the question the Council had to consider was whether medical practitioners should be allowed, by surrounding themselves with the apparatus of a committee and of a hospital, to advertise indirectly in a way in which they would not be permitted to advertise directly in their personal capacity. Mr. Forrest stated that the institution was

established to meet what was considered a public need, that is to say, for people who could not afford to pay high consulting fees. He and others interested in the institution were influenced to advertise by the fact that certain other hospitals advertised in all the Sunday papers. He also stated that Mr. Yates, described as a consulting engineer and founder of the Clinique, had guaranteed £5,000, and that nearly £2,000 had already been expended. He himself, he said, was working without remuneration. The hearing of the case on May 26th was adjourned to the following day to enable the respondent to produce further evidence, and his legal representative informed the Council that he proposed to produce the books and accounts of the Clinique, and also, if possible, to call members of the committee. When the case was called on May 27th the solicitor of the Council read a letter from the respondent stating that he did not propose to produce further evidence, and asking that his name should be removed from the *Medical Register*. The Council adjourned the case from the May session until the November session in order to give the respondent more time to produce further evidence in answer to the charge.

When the case came on again, on November 24th, Mr. Forrest did not appear and was unrepresented, but the solicitor of the Council read a letter from him, dated November 15th, transmitting a statutory declaration made by Mr. Yates, stating that he had provided funds for the foundation of the institute, and had guaranteed it against loss for a period of five years; that the administration of the Clinique and the management of the finances were under the control of an honorary committee, of which Mr. James Forrest was the only medical member; that any excess of income over expenditure should be devoted in the first place to the provision of an in-patient department, and afterwards to the repayment of the donor; and that no salary should be given to the surgeons until the donor was reimbursed, and that such salary should not exceed £100 per annum, as it was intended that this honorarium should be given with the view of excluding purely honorary services, and not as adequate remuneration. The Council, without desiring to hear further evidence, resolved to direct that Mr. James Forrest's name should be removed from the *Medical Register*. Mr. Forrest's contention that the advertisements of the Eye and Ear Clinique should be condoned because several hospitals advertised in the Sunday papers was, of course, no answer to the charge made against him, and Mr. Smith Whitaker, in opening the case, pointed out that though other institutions advertised they treated persons who were believed to be fitting recipients of charity, that there was at least some degree of inquiry to ascertain whether applicants ought to be treated at reduced fees, so that such institutions were not carried on solely for paying patients, as was the case with the Eye and Ear Clinique. But the point having been raised, it would seem that the Association may find it desirable to investigate the nature of the advertisements issued by various special hospitals, and would, we have no doubt, not hesitate to call the attention of the medical staff of such institutions to anything that may be deemed objectionable in the manner or form of such advertisements.—*British Medical Journal*, December 3rd, 1910.

* * * *

Prize.

To Dr. Etienne Ginestous, of Bordeaux, the Clarens Prize, of the value of 400 francs, has been awarded by the *Académie de Médecine*.

* * * *

Treatment of
Ophthalmia
Neonatorum.

THE following suggested scheme for adoption by local sanitary authorities in connection with the treatment of ophthalmia neonatorum has been issued by the Central Council of the British Medical Association for the consideration and guidance of the Divisions of the Association :—

INTRODUCTORY.

1. The action of the Local Sanitary Authority must depend upon whether information, as to a child with appearances suggesting Ophthalmia Neonatorum, comes, in the first instance, from a midwife or a medical practitioner.

2. If the mother has been attended by a midwife, the first source of information to any public authority is usually the certificate furnished by the midwife to the Local Supervising Authority of her having advised that medical help be summoned on account of the existence of such symptoms.

3. If the mother has been attended by a medical practitioner, or if a medical practitioner has been summoned specially to attend the child, the information may be received through his notification of the case to the local Medical Officer of Health.

4. It is convenient, therefore, to trace the procedure in these two groups of cases separately.

A.—CASES ATTENDED BY A MIDWIFE.

Notification.

5. In order to secure the prompt notification of the Sanitary Authority as to the existence of a suspected case the following arrangements should be made :—

(a) The Local Sanitary Authority, and the Local Supervising Authority under the Midwives Act, should cause to be issued periodically to every registered midwife a circular calling her attention to the requirements under the Infectious Diseases (Notification) Act, and her responsibility under the Midwives Act, and containing directions of the kind recommended in the Directions to Midwives proposed to be issued by the Central Midwives Board (*see* Appendix).

(b) If the Medical Officer of the Local Supervising Authority of Midwives is not identical with the Medical Officer of the Local Sanitary Authority, arrangements should be made between these two Officers for prompt exchange of information as to such cases.

Procedure of Medical Officer of Health on Receiving Midwife's Notice.

6. When the Medical Officer of Health receives the information contained in a midwife's certificate he should at once ascertain whether medical help has been obtained by the parents, and, if not, should urge that a medical practitioner be at once called in and draw the parents' attention to their responsibility under the Children Act, 1908.

7. The Medical Officer of Health should be in a position to inform, and should inform the parents that if they are unable to defray the cost of medical attendance or nursing, assistance will be given by the Local Sanitary Authority.

The Medical Officer of Health will consider, in such cases, whether, in his judgment, the case can be effectively treated at home, and, if he is of opinion that it cannot, he will make the necessary arrangements for institutional treatment.

B. CASES UNDER MEDICAL CARE.

8. If the case has been notified by a medical practitioner, or if the Medical Officer of Health, on investigating a case reported by a midwife, finds that a medical practitioner is in attendance, he will ascertain from him (*a*) whether the case can be satisfactorily treated at home, and (*b*) whether any other assistance, such as nursing, bacteriological examination, &c., is required.

C. PROVISION FOR TREATMENT AT HOME.

Nursing.

9. In cases treated at home the Local Sanitary Authority must be prepared to make adequate provision for day and night nursing of the case.

D. INSTITUTIONAL TREATMENT.

10. Provision for those cases which cannot be satisfactorily treated at home should be made by the Local Sanitary Authority, which should not be relieved at the expense of the charitable and of the medical profession of duties which appropriately belong to such public authority.

APPENDIX.

(Referred to in paragraph 5 (*a*) above.)

Leaflet Issued by the Central Midwives Board to the various Local Supervising Authorities and to the Training Schools and Teachers recognised by the Board.

INFLAMMATION OF THE EYES IN NEW-BORN CHILDREN.

OPHTHALMIA NEONATORUM.

1. This is a very common cause of hopeless blindness, which is one of the greatest misfortunes that can happen to a child. A very large number of children will be saved from blindness if the following directions of the Central Midwives Board are observed.

2. The disease generally arises from purulent discharges from the mother getting into the baby's eyes at birth.

3. It is therefore of the greatest importance that this should be prevented :—

(*a*) By curing such discharges if possible before Labour. This requires medical treatment (Rule E 19 (2) and (3)).

(*b*) By taking the greatest care that such discharges shall not be carried into the baby's eyes when it opens them for the first time soon after its head is born.

4. The discharges may be carried into the baby's eyes in the following ways :—

- (a) The discharges collect round its eyes, especially the eyelashes, and easily get into its eyes.

This can be generally prevented if the midwife observes Rule E 14 :

“ As soon as the child's head is born, and if possible before the eyes are opened, its eyelids must be carefully cleansed.” They should be thoroughly wiped with clean material such as cotton-wool, lint, or rag, using separate pieces for each eye. The reason for this is that the piece used for wiping the first eye will be polluted by the discharges, and should not be used for the other eye.

- (b) New-born babies sometimes rub their eyes with their hands. This may rub the discharges into their eyes.

When Rule E 14 has been complied with the baby's hands must be carefully cleansed.

- (c) When the baby is bathed, the discharges with which its body is covered during Labour are washed off into the bath-water. If its face is washed in this water matter may get into the eyes.

N.B.—The above directions are to be observed in *all* cases, whether purulent discharges are known to be present or not.

The Central Midwives Board is determined, so far as lies in its power, to secure the strict observance of its Rules and Directions, and to punish any failure to comply with them, even in cases where no harm can be proved to have followed from their neglect.

F. H. CHAMPNEYS, M.D., F.R.C.P.,

Chairman of the Central Midwives Board.

December, 1909.

This leaflet was drawn up and issued at the request of the Board.

* * * *

The responsibility of Opticians. WE understand that in the action of Markham v. Thomas (fully reported in the December, 1910, number of THE OPHTHALMOSCOPE), the plaintiff has served a fresh notice of trial. The case, however, will not be heard this sittings.

* * * *

DOWN BROS., Ltd., of St. Thomas's Street, London, have been awarded the Grand Prix (highest award) for surgical instruments and aseptic hospital furniture at the Buenos Aires Exhibition, 1910, as well as the Grand Prix (highest award) at the Brussels Exhibition, 1910.

THE OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

VOL. IX.—No. 2.]

FEBRUARY 1, 1911.

[TWO SHILLINGS.

CONTENTS.

Original Communications.—

	PAGE
1. R. H. Elliot, M.D., I.M.S. and A. C. Ingram, M.D., I.M.S.—A case of Mickulicz's Disease	90
2. T. Harrison Butler, M.D.—Some Unusual Manifestations of Infection with the Klebs-Löffler Bacillus	95
3. Ernest E. Maddox, M.D., F.R.C.S.—A Miscellany of Small Contributions... ..	97
4. H. S. Ryland.—Optical Problems in Ophthalmology: 1. The Nature of Light	100

Clinical Memoranda.—

1. Ernest Thomson, M.D.—Note on a Convenient Method of Employing Prisms on Trial	105
2. Arthur H. Platt—A Case of Sarcoma of the Supra-Renal Body, with Secondary Involvement of the Vault of the Skull and Orbits	107

Novelties.—

1. Twin Scissors for Sclerotomy (Herbert's Operation). By N. Bishop Harman	109
2. A New Lid Holder for Kuhnt's Resection. By Cyril Shepherd	110

Review.—

Facial Hemiatrophy: its Clinical Varieties and Pathogeny. By Drs. Sainton and Baufle	111
---	-----

Translation.—

The Simplification of Test Types. By Dr. L. Dor	121
--	-----

Current Literature.—

I. Dystrophia Epithelialis Corneæ	122
II. Varix Formation on the Optic Disc	123
III. Dermoid Tumours	123
IV. Choked Disc	124
V. Mucous Patch on the Conjunctiva	125
VI. Lesions of the Optic Tracts in Cerebro-Spinal Meningitis	126
VII. Ophthalmomalacia	127
VIII. Electric Cataract	128
IX. Ophthalmoplegia	130
X. The Eye and Synthetic Compounds of Arsenic	132
XI. Operations	134
XII. Trachoma	144
XIII. The Etiology of Iritis	146
XIV. Nystagmus	148
XV. Remedies	150

Book Notices	152
---------------------	-----

Correspondence	155
-----------------------	-----

Notes and Echoes	156
-------------------------	-----

ORIGINAL COMMUNICATIONS.

A CASE OF MICKULICZ'S DISEASE.

BY

MAJOR R. H. ELLIOT,

AND

CAPTAIN A. C. INGRAM,

M.D., etc., I.M.S.,

M.D., etc., I.M.S.,

SUPERINTENDENT GOVERNMENT OPHTHALMIC
HOSPITAL, MADRAS.ACTING PROFESSOR OF PATHOLOGY,
MEDICAL COLLEGE, MADRAS.

CLINICAL DETAILS.

BY

MAJOR R. H. ELLIOT, I.M.S.

S. Soundari, æt. 49, female, Hindu. Admitted August 3rd, 1910. Date of operation right side, August 20th, 1910; left side, September 9th, 1910. Date of discharge, October 18th, 1910. Diagnosis: Mickulicz's Disease.

History.

The patient says that ten months ago she had an attack of sore eyes, for which she used native remedies; ten days later she noticed a small painless swelling, about the size of a bean, over the seat of the right lacrymal gland; eight days after the appearance of the swelling on the right side, a similar swelling was noticed on the left side in the same region. Both these lumps have been growing steadily ever since.

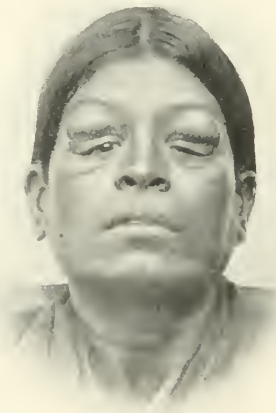


Fig. I. —Front view taken on 5th August, 1910. Note the fulness of the parotid regions, especially the left.

Present Condition.

Lacrymal glands: both glands are much enlarged (*vide* figs. I, II, and III), the right more so than the left; they bulge almost like blunt horns. Dimensions from above downwards: R. 25 mm. L. 23 mm., from side to side R. 40 mm. L. 36 mm.; thickness from before backwards R. 16 mm. L. 15 mm.

Physical characteristics: both tumours are freely moveable, they occupy the upper-outer segments of the orbits, and can be felt to pass back under cover of the overhanging bone; they feel almost as hard as cartilage, and admit of a fair amount of movement on the deeper structures; they are



Fig. II.—Three-quarter view showing both the tumours.

rather irregular, and present a granular surface. The accessory portions of the glands are also enlarged and project downwards into the conjunctival sac, pushing the somewhat congested conjunctiva before them; they are rather hard to the feel. Their measurements are as follows: from above downwards, R. 12 mm. L. 8 mm., from side to side, R. 18 mm. L. 16 mm.,



Fig. III.—Side view showing the right gland and a little of the left gland.

thickness from before backwards, R. 7 mm. L. 7 mm. There is a distinct drooping of the lids, giving the "blood-hound eye" appearance described by Ziegler, of Philadelphia; the outer portions of the lids droop more markedly

than the inner (*vide* photos.). The eyeballs are distinctly pushed to the inner side. The movements of the eyeballs are limited on all sides (probably mechanically), but there is a special limitation of the left eye upward. The pupillary movements are normal. The action of the elevators of the lids is decidedly limited above the interpalpebral line. The parotid glands are distinctly enlarged, broadening the face (*vide* photos.): the enlargement is even, firm, and of moderate hardness. The submaxillary glands are distinctly enlarged, irregular, and rather knobby to the feel. The sublingual glands: there is a distinct thickening in the site of these glands, as judged by bimanual examination, and on inspection, also, there is seen a projection on each side of the mid-line of the palate. There is no enlargement of the glands of Blaudin, of the palatine glands, or of the cervical glands. The existing swellings are all painless. Other lymphatic glands were examined, but no enlargement was found anywhere. Tonsils not enlarged; there is some adenoid tissue at the back of the pharynx, but not more than is common in Indian patients. Spleen not enlarged. Nose: nothing abnormal discovered; the passages are free, and the mucous membrane looks quite healthy. Mouth not dry; teeth normal. Conjunctiva distinctly congested, especially over the projecting accessory glands.



Fig. IV.—Taken on 31st August, 1910, in the interval between the two operations, to show the accessory lobe pushing the conjunctiva in front of it. Note the now normal appearance of the right side.

An exhaustive examination of the blood was kindly conducted by Dr. Maitland Gibson, of the King Institute of Preventive Medicine, Guindy, and he found it to be normal in all respects. General health good. Pulse rate 100. Urine: specific gravity 1010, slightly acid, no albumen, no sugar. There is no evidence of tubercle or of any other disease of the lungs.

The patient absolutely declined to wait for X-ray treatment and insisted on surgical removal. Medicinal treatment with potassium iodide and arsenic internally and iodine paint over the swellings, had been tried for a fortnight without marked benefit, and she refused to remain unless the tumours were removed.

Treatment and Progress.

Operation.—August 20th, 1910.—An incision was made parallel to the right eyebrow over the most prominent part of the tumour, which was then shelled out. The part of the tumour corresponding to the main body of the gland went a very long way back and it was consequently difficult to enucleate it in this situation without considerable pressure on the eyeball. The portion corresponding to the accessory gland likewise shelled out easily, but was adherent to the conjunctiva, which was consequently button-holed during the removal of the growth. The appearance of the gland when removed was convoluted, suggestive of the convoluted surface of the brain. The deepest portion of it was very dark coloured, possibly due to hæmorrhage into its substance during removal. Length from before back 47mm., from side to side, inclusive of accessory portion, 35mm. The accessory portion, which was connected with the main gland, had a greatest length of 23·5mm., a breadth of 15mm., and a depth of 13mm. When the tumour was looked at laterally, this accessory portion strongly suggested the appearance of the temporo-sphenoidal lobe of the brain in its relation to the rest of the tumour.

Removal of the left gland was offered to the patient and readily accepted. 10th September, 1910.—Through an incision over the outer half of the left orbit, the tumour with both lobes was removed entire. Like the last, it was distinctly encapsuled and the two lobes were continuous on the outer side. The adherent portion of the conjunctiva was sacrificed and the inflamed conjunctival sac consequently entered. Captain Ingram was present and made preparations.

The wound became infected, evidently through the conjunctival opening, and there was a rise of temperature on the day after operation. The wound was syringed out with perchloride lotion, and subsequently the case did well. At the time there was noticed a very distinct fulness over the left parotid, which felt harder than before. There was a corresponding increase of fulness in the neighbourhood of the submaxillary and sublingual glands. Five days later the hardness of the parotid gland had quite disappeared and the submaxillary and sublingual glands had gone back to their previous condition. The stitches were removed. Two days later, on 23rd September, 1910, the parotid glands were observed to have distinctly decreased in size as compared with their condition before operation. On 1st October, 1910, the parotid and submaxillary glands had still further decreased. At my request, Major Symons, I.M.S., removed a superficial portion of the submaxillary gland and a portion of the parotid gland under chloroform. The parts were at once taken over by Captain Ingram.

Remarks.

(1) The patient gave a clear history of the disease starting in the lacrymal glands and following an attack of conjunctivitis. The other glands, not in continuity with the affected mucous membrane, followed suit later. This is an interesting confirmation of the experience of previous writers. (2) The infection of the wound after the removal of the second gland involved the conjunctiva on that side and was attended by a distinct increase in fulness of the corresponding parotid gland, as well as in both the submaxillary and sublingual glands. This tumescence disappeared as the septic condition of the wound cleared up. (3) The removal of the lacrymal gland appeared favourably to affect the condition of the submaxillary and sublingual glands. (4) The pathological report (which follows) is of great interest as showing the community of morbid structure that existed in the various glands affected.

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PATHOLOGICAL REPORT

BY

CAPTAIN A. C. INGRAM, I.M.S.

Right Lacrymal Gland.—The right lacrymal gland was received in 10 per cent. formalin two days after removal; consequently, it had shrunk to half of its original size. The shape was that of a complete lacrymal gland, and it possessed a definite thin capsule, but it showed no trace of lobulation. On section, it presented a uniform finely granular white surface. Under the microscope, the structure was found to consist almost entirely of small round cells, somewhat larger than lymphocytes, with a very scanty fibrillated interstitial tissue. There were very few capillaries and these were apparently normal in structure. There was a delicate thin fibrous capsule, from which fine fibrous trabeculae radiated into the tissue. The cells contained dark staining, round, and relatively large nuclei with a dense chromatin network, embedded in a small quantity of transparent protoplasm. Here and there were scattered small aggregations of large cells which presented oval nuclei and a considerable amount of faintly granular protoplasm. The nuclei of these cells were often fragmented and their protoplasm was vacuolated, showing that they were degenerating. I found also several structures resembling gland ducts, lined by a single somewhat irregular layer of columnar epithelial cells, resting upon a thin layer of fibrous connective tissue.

Left Lacrymal Gland.—Immediately on removal of the left lacrymal gland I made a number of smears from its cut surface on glass slides and placed small portions of the tumour in formol-Muller and in Zenker's preserving fluid. The remainder of the gland was placed in 5 per cent. formalin. On removal, the gland was soft but distinctly encapsuled, and there was no trace of lobulation. On section, its surface presented a gelatinous grey semi-translucent appearance, resembling that found in highly cellular sarcomatous tumours, but there were no hæmorrhages. Microscopically, its structure was precisely similar to that of the right lacrymal gland, and I was quite unable to demonstrate parasites by any method of staining. Sections prepared and stained by Beckton's method, showed fine Altmann's granules in normal numbers in all the cells. The smears on slides were fixed with methyl alcohol and stained by Leishman's, Jenner's, Giemsa's, and Romanowsky's methods. The cells varied considerably in size from that of a lymphocyte to four or five times as large. Many nuclei had had their protoplasm torn away, other cells, however, appeared to be quite complete. There were very few eosinophile cells, the majority of cells showing a fine basophilic granulation. The nuclei were rounded or oval, and contained a dense chromatin network. I did not see any karyokinetic figures. None of the cells showed appearances in any way resembling parasites, and all the cells appeared to be entirely without a definite cell wall.

Other Glands.—I was again present at the operation on the right

submaxillary and parotid glands. The small portion of the parotid gland removed contained a small gelatinous nodule resembling the tissue of the removed lacrymal glands. This was surrounded by apparently normal lobules of glandular tissue, embedded in fat. Under the microscope, the nodule presented precisely similar appearances to those found in the lacrymal glands, around it were normal glandular alveoli interspersed with fat.

The submaxillary gland appeared to be definitely encapsuled and lobulated, but on section, the glandular tissue was found to be much softer and more translucent than it normally is. Under the microscope irregularly scattered compressed glandular alveoli were visible embedded in cellular tissue resembling in all respects the structure of the removed lacrymal glands. The glandular alveoli in most cases were separated by a delicate layer of connective tissue (basement membrane?) from the cellular tissue. Smears made from this gland showed cells resembling in all respects those seen in smears from the left lacrymal gland. The difference in appearance of the right lacrymal gland was evidently due to the action of strong formalin. Stained sections of both the submaxillary and parotid glands showed that Altmann's granules were present in all save a few degenerate cells.

Comments.—A consideration of the above findings leaves no doubt in my mind that this was a case of Mickulicz's disease identical in all essential characters with those described by Krailsheimer and Randolph. In this case the disease was much more advanced in the lacrymal than in the salivary glands, and from the history it appears to have begun in the former. I have not been able to find details of the cytological characters of the cells in the scanty literature at my disposal. In the apparent absence of cell walls and in the ease with which the nuclei became separated from their protoplasm, the cells of these tumours presented a close resemblance to those of small round-celled sarcomata. The resemblance to normal lymphoid cells was certainly not very close. Endothelial cells were absent except in the capillaries, and the connective tissue network was singularly scanty, so that the appearances certainly did not present any close resemblance to lymphadenomatous tissue. On the other hand, the histological characters of this peculiar cellular infiltration did not present any features of inflammation. Indeed, the atrophy of the glandular elements appeared to be due merely to the compression to which they were subjected by the steady increase of the cellular material. The histological appearances, in my opinion, are those of a multiple cellular growth affecting a number of glands; this growth presents some resemblances to lymphoid tissue, but shows some definite points of difference, so that the term "lymphomatous" is perhaps the most suitable to apply to it in the present state of our knowledge.

SOME UNUSUAL MANIFESTATIONS OF INFECTION WITH THE KLEBS-LÖFFLER BACILLUS.

BY

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A STUDY of the following cases leads to the conclusion that the Klebs-Löffler bacillus may cause severe inflammations which have no resemblance whatever to clinical diphtheria as usually seen in ophthalmic practice, and which are not associated with any symptoms of general toxæmia. In fact,

without a careful bacteriological examination, it would have been quite impossible even to guess at the aetiology of the conditions described :

Cases.

CASE 1.—J. C., male, aged 28 years, was admitted to hospital on December 31st, 1908.

History.—For the past three weeks the left eye has been red and swollen.

Present Condition.—There is intense oedema of both the upper and lower lids of the left eye. There is much chemosis, and slight proptosis of the left eye. There is much boggy oedema of the tissues over the lacrimal gland.

Treatment and Progress.—December 31st. It was supposed that there was purulent dacryoadenitis, and accordingly an incision was made over the gland, but no pus was detected. The director was thrust into the orbit for over an inch, but, again, no pus was discovered.

January 3rd.—The abscess is now pointing at the outer canthus. The region was fully opened up, and much greenish pus evacuated from under the periosteum covering the malar bone, which was roughened and extensively denuded of its periosteum.

The case now recovered, rapidly and completely. No communication was found with the orbit, and the eye in no way suffered from the surrounding inflammation.

A swab, taken from the greenish pus, was sent to the Clinical Research Association. The report received ran as follows: "Blood serum inoculated from the swab gave after incubation a culture containing *Klebs-Löffler bacilli*, pseudo-diphtheria bacilli and micrococci."

CASE 2.—N.R., female, aged 8 years, was admitted to hospital on August 28th, 1909, suffering from acute conjunctivitis and pustular eczema of the lower lid. The patient had a whitlow on the right forefinger, and for some days had had an inflamed eye. When first seen, there was severe conjunctivitis of the left eye, together with chemosis and much oedema of the lids. There was a severe pustular eczema of the left lower lid, extending down over the cheek. The case appeared perfectly clear, *viz.*, a staphylococcal infection of the eye and skin from the whitlow, a combination which is quite common in all eye clinics.

A smear, however, revealed the fact that the pus was swarming with bacilli, which showed typical bipolar staining. There were only a very few isolated cocci. The bacilli were so morphologically characteristic of *Klebs-Löffler bacilli* that a swab was sent up to the Clinical Research Association on August 20th. The report was that a diphtheroid bacillus was present, associated with *Staphylococcus pyogenes aureus*. Animal experiments were made, and the bacillus was found to be the *Klebs-Löffler*.

The child was not in the least ill, and the inflammation subsided at once when treated with protargol and perchloride lotion. She was discharged on the 25th perfectly well, before the final report was received, and has not been seen since.

CASE 3.—E.W., aged 62, came to the hospital on April 4th, 1910, to know whether anything could be done to give her a little sight. The left eye had been enucleated in 1882 by Mr. Cheshire at Birmingham, on account of inflammation. The right eye began to fail nine years ago.

Present Condition.—There is a dense leucoma in the centre of the cornea which is non-adherent. The pupil is small, central, and does not react. The cornea round the central opacity is clear, but the pupil is quite veiled by the nebula. T.—1/2. V. — perception of light: projection doubtful on nasal side. Pupil does not dilate with atropine. As patient was very anxious to have something done, an optical iridectomy was advised, but little hope was given that it would do much good.

Treatment and Progress.—April 16th. Admitted. By a misunderstanding, instead of wiping the lids with 1-500 spirit bin-iodide lotion, a compress was put on and left on all night. The next day the lids were so inflamed that operation was deferred.

April 19th. An optical iridectomy was performed down and in, so that light should be projected upon that part of the retina which had the best vision. The most stringent precautions were adopted. The eye was well irrigated with 1-10,000 perchloride lotion, all instruments were boiled, and individually held in boiling water immediately before use. I invariably wear a head bag and mask, but at that time the sisters and nurses did not. A good coloboma was obtained.

April 21st. The wound has closed. Anterior chamber re-formed. Some swelling of lids.

April 23rd. There is some chemosis, but no infection of the wound. The cornea is hazier than before. Eye injected.

April 26th. Intense injection of the eye, great chemosis, and swelling of the lids, some proptosis. The eye itself is remarkably little affected. Rods found in pus which exhibit characteristic polar staining. 6,000 units of antidiphtheritic serum injected.

May 11th. The pus has given a *pure culture* of *Klebs-Löffler bacillus*, which subsequent animal experiments showed to be virulent diphtheritic bacilli. The pus still shows polar stained bacilli but no micrococci. A few diplococci seen.

May 14th. The lids are more swollen than ever, but there is no sign whatever of any membrane, and never has been. There has been no rise of temperature. To-day for the first time there is a purulent infection of the cornea, starting from the scar of the operation wound.

An examination of all the patients in the ward showed that four other cases had *Klebs-Löffler bacilli* in their fauces. These included two fractures, a traumatic coxa vara, with separated epiphysis, and a case of endometritis. Subsequently, the Sister of the ward was also isolated as a diphtheria carrier, and swabs from other nurses were returned as "suspicious."

The ultimate end of the case was phthisis bulbi.

CASE 4.—Soon after this last patient was operated upon, a man who had just been discharged from the hospital after enucleation of his eye following an accident, returned with a purulent discharge from the socket. Examination of the pus showed bacilli with all the morphological characteristics of the *Klebs-Löffler bacillus*.

Remarks.

There seems little doubt that Case III became infected with a virulent diphtheria bacillus while in the ward waiting for operation. Instead of producing a characteristic membranous conjunctivitis, a purulent process developed, as in the other three patients cited. These four cases show how essential it is that all doubtful inflammations should be examined bacteriologically. The last two examples demonstrate that diphtheria carriers constitute a real danger in wards where eye operations are being nursed. Fortunately, the iridectomy was of the nature of a forlorn hope, but it might have been part of a normal extraction upon a healthy eye.

A MISCELLANY OF SMALL CONTRIBUTIONS.

BY

ERNEST E. MADDON, M.D., F.R.C.S. ED.

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(1) **External Stops for Corneal Trephines.**—The internal stop at present employed for corneal trephines undoubtedly contributes a measure of safety in preventing the trephine from cutting too deeply, but no internal stop is quite sufficient. In principle, is not an external stop better? I have had one constructed by Messrs. Down Brothers, which is adjustable by means of a little screw in the manner shown by Fig. 1.

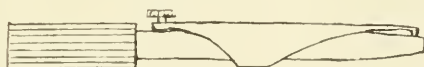


Fig. 1.

It is a metal sheath, cut away like a dress coat, with the extremity turned at right angles towards the trephine, so as to touch the latter, and present a smooth flat surface with rounded edges, against the sclera. This dress coat shape is intended to keep the stop, during the oscillations of the instrument, from touching the reflected conjunctiva. We probably rarely employ more than three-fourths of a revolution in the cutting movement of a trephine. It is posteriorly, towards the ciliary body, that we desire a trephine to be guarded with especial care. It is all the better, as Major Elliot points out, for the front part of the incision to be completed first, so as to enter the anterior chamber a trifle in advance. The internal stop should, of course, be employed as well.

(2) **Guide for Corneal Trephines.**—In placing the trephine on the sclera there are the opposite dangers of injuring the conjunctiva if it be carried too far forward, or of excessive retreat in the opposite direction. The apparatus shown in Fig. 2 illustrates a guide which I am having made to fulfil the sevenfold purpose of:

- (1) Finding the best spot for the trephine.
- (2) Guiding it to that spot.
- (3) Retaining it from slipping over the sclera during the cutting.
- (4) Shielding the conjunctiva from damage.
- (5) Holding the eye instead of forceps.
- (6) Regulating the depth to which the trephine can go.
- (7) Preserving the patient from apparent "wobbling" of the field of vision.

It consists of a thin steel tube, out of which a window is cut behind. It is furnished with a handle convenient for holding and this, again, with a disc of thin blackened metal to obstruct the patient's eyesight. From the lower front edge of the tube project one or two fine flattened teeth, the points of which are intended to be inserted into the angle between the reflected conjunctiva and the sclera, so that the eye is drawn downwards by their means. The handle is broad and rough, to furnish a good grip. The trephine is surrounded by a small metal ring, high up, adjustable by means of a screw, by which the depth of the incision can be regulated, since when this ring abuts against the upper edge of the guide, the trephine can proceed no further.

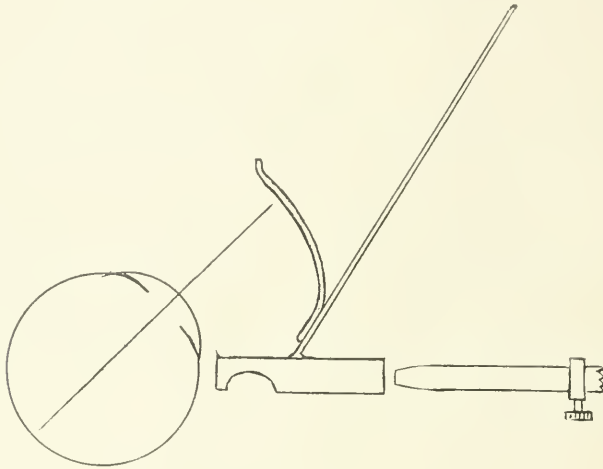


Fig. 2.

(3) **Reopening the Trephine hole.**—The effect of trephining is not always permanent, as doubtless we are finding, and it is an interesting question what is best to do as a supplementary measure. In one case, in which the tension again rose to + 3 after two or three months, I performed an ordinary sclerotomy through the anterior chamber, carrying the Graefe knife through the closed trephine hole, and then under the conjunctiva, so as to leave a broad conjunctival bridge. The result was perfect, the tension having remained normal ever since (about six months). In another case I passed a platinum repositor under the conjunctiva to reopen the aperture, but this was not so successful. It might have been better had I employed one of those fine sharp gouges used for the removal of foreign bodies from the cornea, or a stout flattened needle. It will be interesting to hear the experiences of others in this respect. Possibly, my experience of tension returning again in these two cases may be singular.

(4) **A use for Flexible Collodion.**—After threading a suture half way through the eye of its needle I find that its two halves can be very nicely united by flexible collodion, and that a suture thus made is, within a minute or two, uninjured by boiling. In applying the collodion, the tail end of the suture should be twisted by a nurse, or have an instrument suspended from it, so as to keep it taut, while collodion is rapidly brushed on and rubbed in with the fingers. This plan answers best with fine conjunctival sutures, and enables needles with finer eyes to be employed for a given thickness of suture.*

* Worth first made the sagacious suggestion, some years ago, in his book, that since a needle has to carry in any case a double thread, we may as well get the advantage of the double thread throughout.

For very thick sutures it is advisable to twist them together first.

(5) **A mode of twisting Sutures.**—Any attempt to convolve two halves of a suture together without first twisting up each half independently will have a very unstable result. Even in twisting up each half separately, a perfectly even suture is not likely to be produced. The following plan however, I find, gives a perfect result.—A suture is threaded into a needle to its mid-point, where the needle is temporarily jammed, looped up, or tied with a bow of cotton thread. One free end of the suture is now held in the grip of a needle holder so laid on the mantelpiece that its nose projects over the edge. An artery forceps, made to hang on to the dependent end of the suture, is then set in revolution so as to increase the twist of the thread uniformly in its whole length (the needled loop escaping). Now keeping both halves taut, the two free ends are brought together, between the jaws of the upper needle holder, while the artery forceps is attached to the needled loop and allowed to revolve spontaneously. As it does so the twin threads become uniformly twisted throughout. While still suspended thus it only remains to coat the two-ply suture with any desired coating, or only its tail with collodion.

(6) **Double-needled Double Suture.**—So far we have only treated a single-needled double suture, but a suture armed with a needle at *each* end is so often employed for advancement operations, that the question naturally arises whether the advantage of a double thread cannot be secured for them also. It is, I find, quite easy to pass a collodionised tail end of a double suture through the eye of a needle, collodionising the extremity a second time into contact with the suture. In this case no fewer than four threads have to pass through the track of the needle simultaneously for an inch or so. A still better plan therefore, is to make an endless suture as follows :—

(a) Thread two needles on to a length of silk which twist moderately.

(b) Fray both ends for the distance of about three quarters of an inch, and slightly interweave the silk flosses, binding them together by collodion. By rotation between the finger and thumb, a very smooth, round juncture can be effected, which, indeed, can be made scarcely bigger than the original silk thread, if a few thin strands out of each floss be judiciously cut away beforehand. Finally, this endless suture, with one needle drawn to each end, can be twisted, while the two halves are, if wished, collodionised together. Still further security is afforded if one end of the suture, before being frayed, be made to pierce the suture a few inches from the other end, so that less of the drawing strain is felt by the juncture.

(7) **A use of Mercury.**—After opening a distended lacrymal sac in the usual manner by way of the canaliculi, and washing it out repeatedly with a diluted solution of perhydrol, I then introduce into the sac as much metallic mercury as it appears likely to retain and leave it there until the next visit. It is quite easy to take up the mercury with a fine glass syringe.

Two results follow :

(1) The mercury opens out the folds of the sac and penetrates to its deepest recesses. It thus opens out the funnel-shaped entrance to the strictured lacrymal duct, and by reason of its weight (which it will be remembered) is $13\frac{1}{2}$ times that of water, it exerts a continuous gentle pressure of the softest possible kind, tending to dilate this funnel and to open up the stricture, or at least to prepare it for the entrance of a probe later. When the time comes for the use of the probe at a subsequent visit, it may indeed be passed while the mercury is still in the sac, rendering a false passage less likely to be made. The probe, under these circumstances, should be well greased with vaseline, to prevent the mercury from attacking it.

(2) The perhydrol, which clings to the walls of the sac, attacks the

surface of the mercury, and produces strongly antiseptic oxides, the chief of which is our familiar friend the yellow oxide, which is thus brought into very intimate contact with the mucous membrane, at the same time that all its folds are flattened out. The formation of the oxide continues for a good time. Moreover, the presence of the mercury excites the release from the perhydrol of nascent oxygen, which covers its surface with fine gas bubbles, and which itself is strongly antiseptic, while the commotion created by the effervescence of these bubbles effectually exposes to active antiseptics every particle of unhealthy material contained in the sac.

When convenient, the mercury can be replaced every second day, and the patient should be cautioned against holding the face down too much for the first few hours after its introduction. It is not always necessary to wash out the sac with perhydrol on each occasion before introducing fresh mercury, since to do this too often might irritate the sac. A milder wash should therefore be used in the intervals. The mercury itself is totally unirritating. The frequency with which the application should be repeated depends on the severity of the case.

The effect of perhydrol on mercury can be exhibited very prettily by pouring out a few drops of the former into a watch glass and allowing a drop of mercury to fall into it. The metal speedily becomes discoloured and surrounded with minute bubbles of gas, while its globular shape is impaired by the weakening of its surface tension. Soon the yellow and red oxides appear.

It only remains to specify the class of case for which this treatment is to be recommended.—For slight lacrymal ailments curable by ordinary injections it is not of course indicated, nor for those which are hopelessly past curing by anything less than extirpation. There is an intermediate class in which the nasal duct is closed, a small number of which might be rescued from extirpation by this treatment.

As a *diagnostic agent* I find mercury extremely convenient. The degree of patency of the nasal duct can be gauged pretty accurately by the rapidity with which it permits mercury to run into the nose, and also by the size of the globules which escape. A glass beaker or inverted bell-jar is placed in the patient's hands, and the nozzle of the mercury syringe is then introduced horizontally into the sac at such an angle that no mercury escapes. The patient's head is then bent forward over the bell jar and the syringe closed. In some cases it is desirable to press the finger of the other hand upon the upper canaliculus. Through the normal duct the mercury passes with great freedom.

I have not yet had an opportunity of trying mercury treatment for the frontal sinuses.

OPTICAL PROBLEMS IN OPHTHALMOLOGY

BY

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I. The Nature of Light.

IT may at first be thought that the actual nature of light has very little bearing upon its application, in other words upon optics. This however is not the case, as a good knowledge of the nature of light, as ascertained by experiment and theory, will help very considerably in our work. The

accepted theory of light is that known as the undulatory or wave theory and for the purpose of the earlier part of this work we will accept it without discussion.

According to the wave or undulatory theory, all space is permeated by a medium termed the ether. Of the nature of the ether we are ignorant, except that we know that it is capable of transmitting very minute transverse vibrations at a great velocity. We also know that its nature is such that the planets and all substances move freely through it. Any disturbance of this ether at a given point will cause energy to radiate in the form of spherical transverse waves with this point as centre. An excellent illustration of this may be observed by dropping a stone in still water and watching the wave rings spread out. The only difference other than that of size between these water waves and those of the ether is that while the waves of the ether are spherical, those on the water are on a plane surface. Both are transverse—that is to say, the wave movement is at right angles with the direction of travel. In each case the wave length is constant for a given wave system, or the distance between the tops or crests of the waves is the same, no matter how far from the centre of disturbance they be measured. The only variation will be in the amplitude or amount of transverse movement.

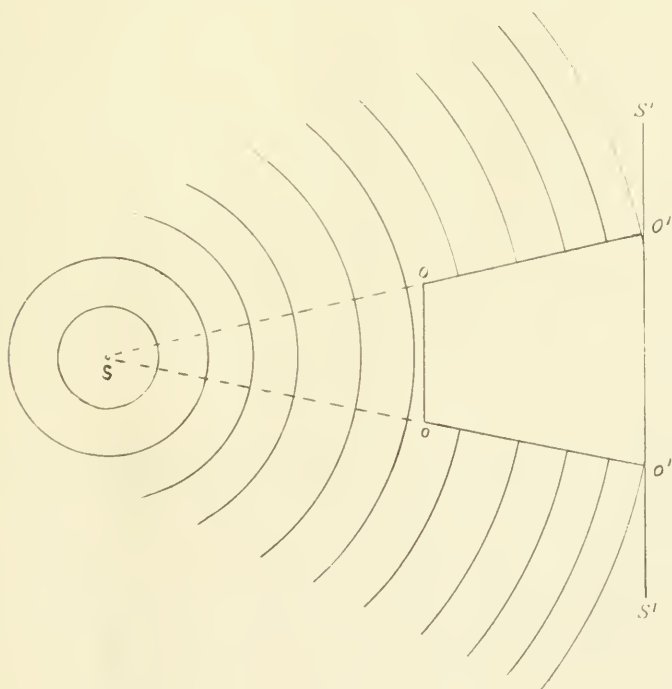


Fig. 1.

In the case of light the cause of disturbance is not a stone but the rapid vibration of the particles of the luminous source setting the ether in motion. The wave length of visible light is approximately one forty thousandth part of an inch, while the velocity of propagation is 184,000 miles per second. Differences of wave length give us our conception of colour—that is, different wave lengths appear to us to be different colours. Differences of amplitude, or up and down movement of the waves, are interpreted by our senses as differences of intensity. In different materials light travels with different

velocities, giving rise to the phenomenon known as refraction. The reason for the existence of shadows may easily be demonstrated by this theory.

In Fig. 1 let S be a source of illumination and O an object, then while light passes along the lines O, O' and outside them, between them is darkness and if a screen $S'S'$ be placed at any point, a dark patch or shadow $O'O'$ will be formed. It will further be noticed that the lines S, O, O' are straight lines and diverge from S , being radii to the waves. From this we arrive at two conclusions, that although light is propagated in the form of spherical waves, its direction is always a straight line, this straight line being a radius to the waves at any point. We may now define light as being that form of radiant energy which affecting our visual organs gives rise to the sensation of vision. Since in general, all light waves considered in space are spheres and considered in a plane are circles, a study of the geometry of the circle will be of very great assistance to us when studying optical problems.

A circle is a space bounded by a line such that it is at all parts equally distance from a point termed the centre (Fig. 2.)

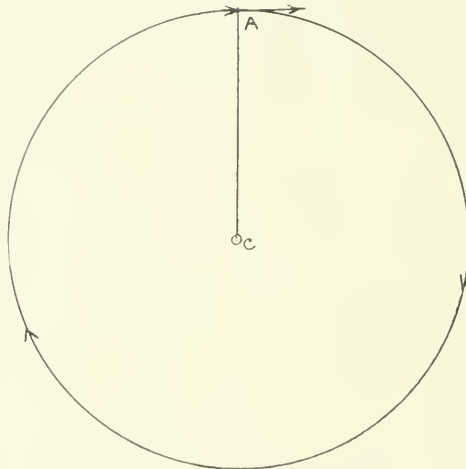


Fig. 2.

This line is termed the circumference. If we consider a point on the circumference moving in the direction indicated by the arrow heads; then at any instant the direction of travel of points will be at right angles with a line drawn from the centre to the point (or a radius) $C.A.$ (Fig. 2) where C is the centre and A the point on the circumference. In other words the circumference of a circle at any given point is at right angles with the radius drawn to this point. We may also consider a *sufficiently small* part of the circumference of any circle as being a straight line; and we may also consider any straight line as being part of the circumference of a circle of sufficient radius. For this reason we speak of the light from a distant source as being parallel light, since the portions of the waves with which we are dealing are plane and consequently parallel with each other.

In Fig. 3 $AB, A'B'$ are two lines showing the continuation of the circumference from the points A and A' . These lines are called tangents and are at right angles with the radii CA, CA' . The angle between these tangents represents the angle through which the circumference has turned in passing from the point A to the point A' and is known as the curvature of the circle, when from A to A' measured round the arc is unity. The *curvature* of a circle therefore may be defined as being the angular change of direction

of the circumference when passing over unit length of arc, The angle between the radii CA, CA' is however equal to that between AB and $A'B'$ but since all angles are measured in radians—that is, length of arc divided by length of

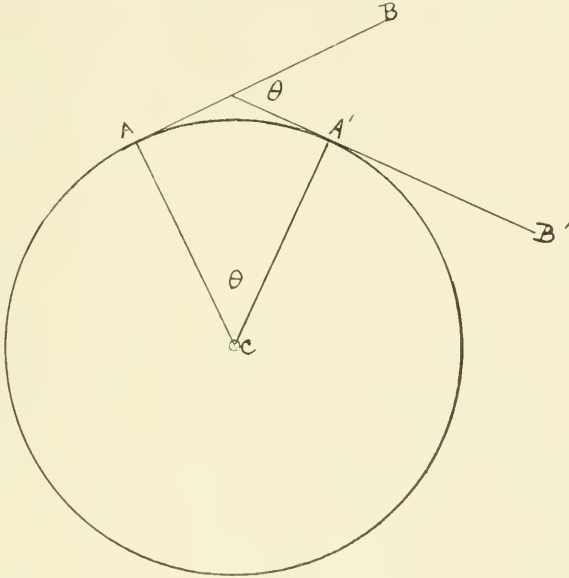


Fig. 3.

radius—then in the case of curvature we have length of arc unity or 1, the curvature is θ or $\frac{1}{r}$. In optical work, we take as our unit the metre and a curve whose radius is one metre is said to have a curvature of 1 diopetre, and

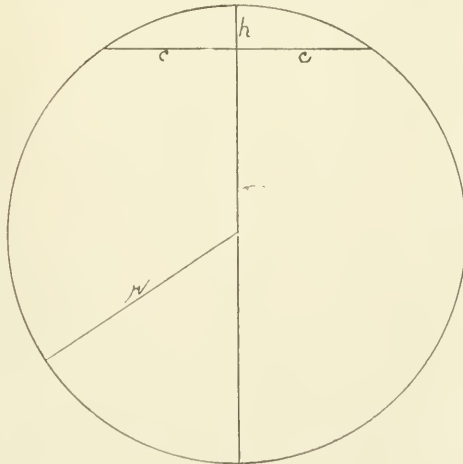


Fig. 4.

the curvature of any curve may be expressed in dioptries by dividing the length of the radius expressed in metres into 1 metre. From this it will be observed that the shorter the radius the greater the curvature and *vice versa*.

From Euclid we find that $c^2 = h.m.$ Fig. 4. Since $m = 2r - h$ where r is the radius, we at once obtain

$$r = \frac{c^2}{2h} + \frac{h}{2}$$

When h is small compared with c^2 , $h/2$ may be neglected, and we have

$$r = \frac{c^2}{2h}$$

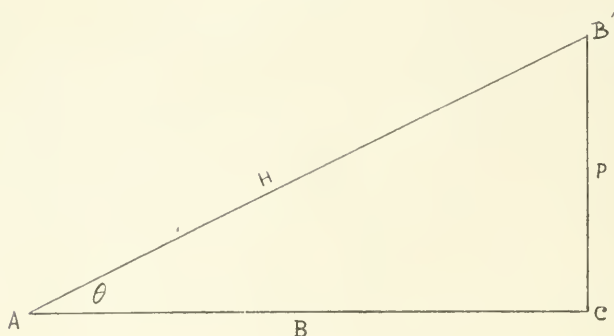


Fig. 5.



Fig. 6.

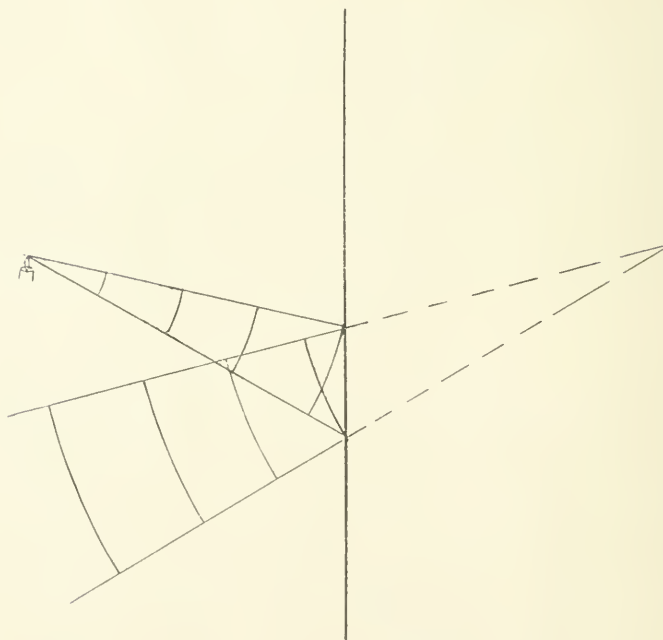


Fig. 7.

From this equation it is evident that any change in h will produce a change in r which is inversely proportional to the change in h or taking the curvature

$$\frac{1}{r} = \frac{2h}{c^2}$$

we see at once that $\frac{1}{r}$ the curvature is proportional to h when c is constant, this being of course when h is small compared with c^2 .

While speaking of matters mathematical I will deal with the three elementary trigonometrical ratios, viz. : sine, cosine, and tangent.

Let A B' C, Fig 5, be a triangle right angled at c, the three sides are the hypotenuse H, the perpendicular P, and the base B. The length of these three sides will always bear the same proportion to each other no matter what the size of the triangle provided only the angle θ is constant. In other words for a given angle θ there is a constant ratio between the lengths of the sides of a right angled triangle no matter what the size of the triangle. The ratios between the sides have been given names as follows :—

$$\begin{aligned} \text{Sine } \theta & \text{ written } \sin \theta = \frac{P}{H} \\ \text{Tangent } \theta & \text{ „ } \tan \theta = \frac{P}{B} \\ \text{Cosine } \theta & \text{ „ } \cos \theta = \frac{B}{H} \end{aligned}$$

The value of these ratios for any given angle may be readily obtained from the published tables.

Plane Surfaces.—One of the commonest phenomena connected with light is that of reflection. Reflection is of two types, regular and irregular. Regular reflection is the complete turning aside of a beam of light as a whole from one direction to another, and follows definite laws.

Irregular reflection is that form of reflection in which a beam of light, instead of being turned aside as a whole, is broken up or scattered. This effect generally takes place when the roughness of the reflecting service is greater than $\frac{1}{4}$ the wave length of the incident light. When this is the case every part of the beam is reflected in a different direction giving rise to what is known as the scattering of light. Fig. 6 gives an excellent idea of scattered light, while Fig. 7 illustrates regular reflection.

CLINICAL MEMORANDA.

NOTE ON A CONVENIENT METHOD OF EMPLOYING PRISMS ON TRIAL.

BY

ERNEST THOMSON, M.D.,

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IT is probable that most ophthalmologists will admit that the prescription of prisms or prismo-spheres off-hand—that is, without allowing the patient an opportunity to test the prisms at home—is apt to be unsatisfactory.

As a matter of fact, it is not, as a rule, a sufficient test of a prismatic correction merely to allow the patient to wear the glasses for a few minutes in the consulting or waiting room. His return in a few days' time, with a variety of complaints about the new glasses, is annoying, even though the surgeon may have warned the patient of the possible unsuitability of the correction.

If, on the other hand, the surgeon lend the patient an ordinary trial frame and the necessary lenses and prisms, it is very unlikely that the patient will

be able to keep them adjusted. Here, again, there is no certainty or satisfaction.

I do not suppose there is any novelty about the following procedure which I have sometimes adopted, in order to get over the difficulty.

A round-eyed steel spectacle frame of average width and bridge so that it will fit over and in front of a patient's present correcting glasses (if any), and having straight sides, has, ground to fit it, a number of prisms, *e.g.*, of 0.5, 1.0, 1.5, 2.0 and 3.0 prism dioptries. With these, in pairs, a range of prisms of sufficient strength for ordinary purposes is obtained.

When the surgeon has determined the amount of prism with which he wishes to experiment, he fits that amount into the eyes of the round-eyed frame, and lends it to the patient to wear for a day or two, either alone or in front of any lens correction he may have. If the prisms are not comfortable another pair can then be tried, if thought proper. At any rate, the patient has been put to no unnecessary expense, and there can be no cause for grumbling.

Unless the surgeon is quite satisfied that the base-apex line of his round prisms is correct, he will be ill-advised to trust to these diamond markings on the glass. It is better to set the prisms optically, in the following way :—

Let us suppose it be desired to emply 2 prism dioptries. A prism of 1 P.D. is placed base-in (for example), in each eye of the spectacle-frame. Leaving the pinching screws slack enough to allow of rotation of the glasses without being so slack as to permit of their falling out, the frame is placed on the patient's face and he is asked to look at a point of light at the other side of the room. He will see three spots of light, *viz.*, a central bright spot, (which is the real, binocularly-seen fixation object), and, on each side of it, a faint spot. These lateral spots are internal reflection images and they will lie in one straight line with the real point of light when the base-apex lines of the prisms are continuous one with the other. These images are "homologous" when the prisms are base to base and "heterologous" when they are apex to apex.

When this line of three images is horizontal the prisms are horizontal. The surgeon must, therefore, in this particular case of a pair of prisms base-in, rotate the prisms until the patient sees the three spots in one horizontal line. The pinching screws are then tightened, and the patient goes home to try the prisms at leisure.

The happiest results sometimes follow the prescribing of prisms, and a few of my most satisfied patients have been those to whom prisms alone have been given. Yet it is often uncertain whether the correction will be accepted. The little device which I have described will lessen the risk of ordering a patient a pair of glasses which he cannot wear, but has to pay for all the same.

It is perhaps advisable to remind my readers that, owing to the strong apex-ward deviation of the reflection image in the higher ranges of prism, the method of adjusting the prisms, above referred to, is only available for the low strengths which are commonly employed therapeutically.

A CASE OF SARCOMA OF THE SUPRA-RENAL BODY, WITH SECONDARY INVOLVEMENT OF THE VAULT OF THE SKULL AND ORBITS.

BY

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RESIDENT MEDICAL OFFICER, QUEEN'S HOSPITAL FOR CHILDREN, LONDON.

Fanny T—, aged 4 years, was admitted to the Queen's Hospital for Children on June 6th, 1910, with an abdominal tumour. During the nine weeks previous to admission the child had been fretful and tired, had complained of abdominal pain, and was noticed by her parents to be getting paler. The child had never suffered previously from any serious illness, and the family history was good.

On admission, the patient was extremely anæmic, with a yellowish appearance but no jaundice, somewhat wasted, and of an irritable disposition.

On examination, the abdomen was flaccid, with no apparent pain or tenderness, but a large hard mass could be detected crossing the abdomen above the umbilicus and corresponding in position to the transverse colon. Liver and spleen were both palpable. Into the upper lid of the left eye was



a subcutaneous extravasation of blood, which had appeared two days before admission. The cervical and inguinal glands were enlarged and painless. The heart and lungs were apparently normal. The temperature was slightly subnormal.

The urine contained a trace of albumen, but no blood or sugar, the deposit being a few pus corpuscles and cells, the latter probably of renal origin. The specimen gave a strong brown coloration with nitric acid and contained a considerable quantity of a chromogen, which did not yield the ordinary indican reactions.

The blood, on dilution, gave a dense white precipitate. Hb 57 per cent. Red corpuscles 3,375,000 per c.mm. White corpuscles 4,250 per c.mm.

The red cells showed a small degree of poikilocytosis and polychromatophilia, with marked variation in size and staining. Although the majority

stained well, a fair number were degenerate and ragged at the edges. The white corpuscles, although diminished in number, were otherwise natural.

Progress and Result.—Three days after admission, there was extravasation of blood into the lids of both eyes, and the mass in the abdomen was unchanged, although the bowels had been well opened by drugs and enemata.

On the 14th of June the hæmorrhage around the right eye had extended over the right temporal region and the eye was proptosed. The hæmorrhage around the left eye had been quite absorbed.

Under an anæsthetic, administered on the 17th of June, the mass in the abdomen was found to occupy a large space, but the liver and spleen were separated from it by an area of resonance.

On the 21st of June there was a further hæmorrhage into the tissues round the left eye, the right eye remaining as before.

The abdomen became distended on the 2nd of July, and free fluid could be detected in the peritoneal cavity. The superficial veins of the abdomen and back became prominent, and some œdema was present.

On July 7th Mr. Sydney Stephenson examined the patient, and noted that the left eye was on a lower level than the right, and that on palpation of the left lower lid, there was some appreciable thickening, which he thought was due to a growth of the orbit. The right eye was pushed forward and inclined inwards, probably due to a growth behind the upper part of the orbit. Both fundi were of good colour, and there was no apparent obstruction to the retinal veins.

On the 12th of July the abdomen was tapped, the ascitic fluid showing nothing of pathological interest. The hæmorrhage round the right eye had now spread on to the forehead.

An examination of the blood at this period showed a progressive anæmia with some leukocytosis; *viz.*—Hb 40 per cent.; reds 2,160,000 per c.mm.; whites 20,000 per c.mm. Differential count: polynuclears 60·6 per cent.; lymphocytes 30·6 per cent.; large hyalines 6·3 per cent.; eosinophiles 2·0 per cent.; basophiles ·3 per cent. From this date the child went rapidly downhill without any marked change and died on August 8th, 1910.

Post-mortem report (from the notes of Dr. G. Woodforde, pathologist to the Hospital). A large retro-peritoneal growth was discovered occupying the upper half of the abdomen and enveloping the left kidney. The growth was of a deep-red colour and soft, showing signs of subperitoneal hæmorrhages. It was firmly adherent to the stomach and intestines. Histologically, it was a small round-celled sarcoma arising from the left supra-renal body, no supra-renal tissue being present. Secondary deposits were found in the pleuræ radiating along the ribs from the spinal column to the sternum, on the posterior surface of which growth was deposited. The glands in the posterior mediastinum were enlarged.

The cervical glands were greatly enlarged by growth and extended down into the superior mediastinum. Between scalp and vertex was diffuse soft growth. On removing the skull cap, many large patches of soft growth, resembling raspberry jam in appearance, were found. These patches of growth lay between the dura and bone, and were distributed over the whole surface of the cranial cavity, and had caused great roughening and erosion of the bones without any perforation. Large masses of similar growth occupied both orbits; the globe of each eye, however, was not involved. All the other organs of the body were natural.

NOVELTIES.

TWIN SCISSORS FOR SCLEROTOMY (Herbert's Operation).

BY

N. BISHOP HARMAN.

LONDON, ENGLAND.

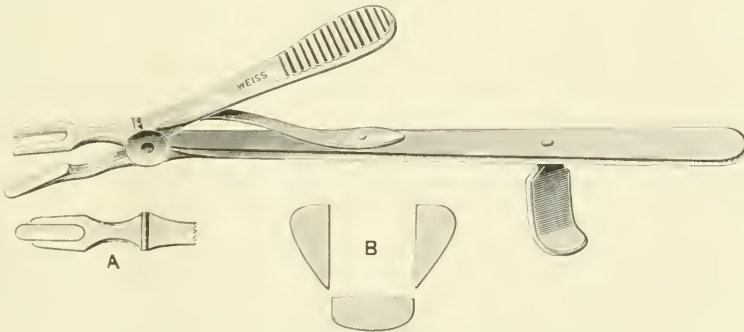
The instrument shown in the figure is designed to facilitate the performance of Herbert's operation of sclerotomy for the relief of chronic glaucoma. The idea in view has been to reduce the difficulty and time involved in making the two lateral cuts for the valve-like scleral flap which is the feature of this valuable operation.

The instrument has been modelled upon the plan, and does the work, of two pairs of scissors, so that it has been called "Twin Scissors."

It makes, on the gradual and shearing approximation of its blades, two parallel cuts, each 4 mm. in length and separated from each other by 3 mm. In appearance it is something like a needle holder, but the blades are different. The lower or male blade is flat and bevelled so that each side presents a sharp edge; its free end is rounded and blunt and projects 2 mm. beyond the female blades. The upper or female blades are a pair of parallel, sharply bevelled blades springing from a common stump.

When the handles of the scissors are closed the female blades shear down on the sides of the male blade and come to rest, overlapping it.

The instrument shown has been used for operating on four human eyes with successful results; it was then used to cut sheep's eyes, rubber sheeting, cloth, and paper, until the keenness of the blades was dulled, when it was successfully sharpened.



A. View of blades from above.

B. Section of blades enlarged.

The lower handle of the instrument has a novelty in the provision of a finger plate, which, being slipped between the second and ring fingers at the joint of the end phalanges, gives a very steady and easy grip of the scissors. In cutting with the scissors, it is essential to press the handles together evenly; if a lateral thrust be imparted to them, the necessary fractional play of the hinge will allow one or other of the female blades to engage its side of the male blade too firmly and perhaps check the cut: if the lower handles of the twin scissors be operated by the ends of the fingers, just as in using ordinary scissors, the cutting will be easy and even. Trial cuts with the scissors should be made on rubber sheeting but not on paper or card.

In operating with the instrument I have found it convenient first to turn forward a flap of conjunctiva from the chosen site of the sclerotomy; then the keratome is inserted into the sclerotic 3 mm. from the clear corneal margin and passed through and under the sclerotic until its point appears within the corneo-iridic angle. It is pushed on until a clear 2 mm. of the blade is within the anterior chamber.

Now the male blade of the twin scissors is pushed along the track of the wound until the projecting 2 mm. of the blade shows within the anterior chamber; the scissors are then closed, the cuts made, the male blade gently withdrawn, and with the replacement of the conjunctival flap, the operation is complete.

In the four eyes operated upon with this instrument eserine was used subsequently for three days.

The twin scissors are made by Messrs. John Weiss & Son, of London.

A NEW LID HOLDER FOR KUHN'S TARSAL RESECTION.

BY

CYRIL SHEPHERD, M.R.C.S., L.R.C.P.

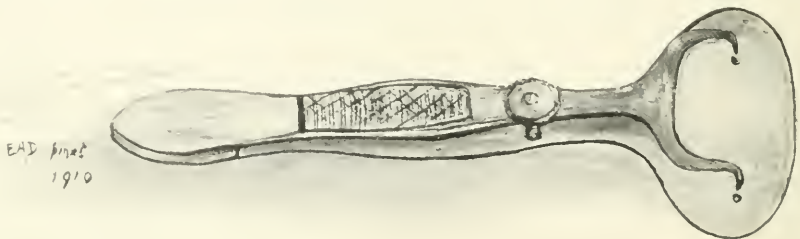
ASSISTANT OPHTHALMIC SURGEON SYDNEY HOSPITAL AND ST. VINCENT'S HOSPITAL.

In the *Archives of Ophthalmology* for March, 1910, there appeared a very interesting article by Dr. Wootton on resection of the tarsus and conjunctiva in trachoma.*

In Australia we have a very large number of cases of trachoma with its results to deal with. For trichiasis and entropion, the operation designed by Dr. Odillo Maher, of Sydney, in cases where the tarsal cartilage is not very much shrunken and distorted, produces most satisfactory and permanent results.

Dr. Wootton's article led me to try Kuhnt's resection in several cases where the opposite condition existed, the immediate results being all that could be desired.

I found, however, the separation of the conjunctiva from the "cartilage" extremely difficult in the middle of the lid, where, in fact, they seem to form one solid mass of scar tissue.



I have found the modified lid clamp, shown in the drawing, of great help in holding the everted lid, enabling one to dispense with the assistant, who is unavoidably much in the way. It consists of the ordinary slightly curved plate of Desmarre's clamp with two small sharp tenaculum points instead of the usual ring.

*For abstract see p. 138 of the present number of THE OPHTHALMOSCOPE.

The lid is everted and pulled over the plate and the tenaculum points are pressed lightly into the conjunctival surface two or three millimetres from the margin, being closed sufficiently by the screw.

They are quite out of the field of operation and do not injure the lid, as the ordinary toothed forceps applied to both surfaces were found to do.

The two holes in the plate are to prevent the points being blunted if the instrument is closed while not in use.

Rather to my surprise, the pressure of the strongly everted lid against the plate was found to control the hæmorrhage efficiently.

I feel sure that surgeons who perform tarsal resection will find this simple instrument useful.

REVIEW.

FACIAL HEMIATROPHY: ITS CLINICAL VARIETIES AND PATHOGENY.*

BY
DR. PAUL SAINTON. AND DR. BAUFLE.
MÉDECIN DES HÔPITAUX DE PARIS. INTERNE DES HÔPITAUX.

ONE sometimes sees in hospital work subjects affected with the curious affection known as "facial hemiatrophy," although that is not because the patients come to seek advice. On the contrary, they sometimes resent undue attention being paid to a deformity to which they have become thoroughly accustomed.

If facial hemiatrophy is a rare malady, it is none the less interesting on that account. Its different aspects form a complex clinical syndrome; its pathogeny raises numberless problems concerning the existence of a trophic function and the paths which it borrows for its conduction.

Historical.

Isolated instances of facial hemiatrophy were described at the beginning of the last century by several authors, as, for example, Parry (1825). But it was only since the appearance of Bergson's thesis in 1837 (compiled under the inspiration of Romberg, and confirmed by the later works of the same author), that the syndrome took its place in pathology under the name of "Romberg's disease." Isolated cases were published by Stilling, Hueter, Schott, Brunner, Eulenburg, and Guttmann. The disease was made known by Lasèque in France in the year 1852. His work was translated into English by Moore, who added to it some new facts. At this epoch, as the result of Samuel's theories on the trophic rôle played by the nervous system, all authors, with Romberg and Virchow, regarded the affection as a tropho-neurosis. This view appears to have been definitely accepted, when, influenced by the reigning ideas, Lande, of Bordeaux, in his thesis (1870), considered the disease to be the consequence of an arrested development of the connective tissue, under the name of "laminar aplasia." This denomination, adopted by Gintrac, was very speedily abandoned: Frémy, Troisier, maintained the nervous theory.

* Translated (by permission) from the *Gazette des Hôpitaux*, 26 novembre, 1910.

Many isolated observations have been published since. Each of them was invoked in favour of the particular theory held by its author. Déjerine observed a case in syringomyelia; Bouveyron, Barrel, and Tournaire furnished numerous arguments favourable to the sympathetic theory. But it is due to Brissaud that the question was explored to its depths. In his lectures he showed the importance of studying the disease, in order to solve the problem of trophism. He placed in relief the existence of hypertrophic syndromes, capable of opposing atrophic syndromes. Claude and Sézary have published a recent case which brings forward important evidence in favour of the central origin of the malady.

Aetiology.

Facial hemiatrophy, according to all statistics, is commonest in the female, and on the left side.

The average age at which it appears is from ten to twenty-five years, although cases have been seen in older subjects. It is exceptional after twenty years.

It is not uncommon to find a history of nervous or psychical degeneration in the antecedents of those affected with the disease. Isolated, it does not occur as a familial condition.

The causes which have been invoked to explain the appearance of facial hemiatrophy include injuries of the head or face consecutive to the application of forceps, to contusions, or to falls, to burns in infancy, or to extraction of teeth. The frequency of dental pain and of migraine during its development has been commented on. Different infective maladies have been often noticed at its beginning, such as diphtheria, simple anginas, erysipelas, typhoid fever, influenza, otitis, infantile paralysis, and hereditary syphilis. The disease, however, sometimes develops without our being in a position to assign any cause for it.

Symptoms.

The common form : progressive facial hemiatrophy.—Facial hemiatrophy begins in a slow and insidious fashion, and may pass unnoticed for a long time by the patient and even by those about him.

Its first sign consists in the appearance of several cutaneous spots, the look and position of which vary according to the individual. These tell-tall marks may appear in the supra-orbital region near the eyebrow, or in the infra-orbital region, or, more rarely, in the middle part of the submaxillary region at the level of the mental foramen, or in the parietal region. It takes the form of a circular or elongated spot of more or less dark colouration or of a kind of pale, decoloured, or sometimes livid *plaque*, which contrasts with the colour of the neighbouring zones. The surface of the lesion is supple, although scaly or covered with a fine furfuraceous desquamation.

Painful crises often accompany the appearance of the spot, and these sometimes take the form of facial neuralgia or of more superficial sensations of twitching or itching.

After a variable time the initial lesion becomes profoundly modified. The skin at the level of the primitive focus becomes depressed, retracted, harsh, and dry; gets shrivelled and wrinkled, like a cicatrix. Its thickness diminishes, so that a fold picked up between the fingers does not exceed a couple of millimetres in thickness. One can see through it, as through a fine veil, the subcutaneous vessels, which thus convey to it a slightly blue or azure colour.

To the touch, it yields a sensation of dryness, as of leather or of parchment. This attenuated skin is spread over underlying layers without being adherent to the latter, but it moulds itself exactly to the parts, following the least inequalities. At this stage the primitive spot is curiously extended at its circumference; other diseased areas appear at the side of the original lesion, and by running together, form a large irregular *plaque*, which may involve the whole of the face.

At the same time the atrophic changes involve the muscles or the subjacent bones. The muscles diminish in volume. They no longer stand out under the skin. But they are not paralysed, and usually react under the influence of electrical excitation. They sometimes show fibrillary twitchings. Most of the facial muscles are affected, such as the orbicularis oris, orbicularis palpebrarum, the zygomatics, and the motor muscles of the ala nasi and of the upper lip, while groups of deeper muscles, such as the temporal and the masseters, may also be involved.

The skeleton is not spared. If the disease evolves methodically by successive levels, the two superior and the inferior maxillary bones, the maxillary bone, the malar bone, the nasal bones, the temporal and the parietal bones atrophy, especially if the affection has commenced in early life. Otherwise, the atrophy of the facial group is much attenuated or may even be absent altogether.

Connected with the osseous atrophy is cartilaginous atrophy, which explains the laxity of the temporo-maxillary articulation mentioned in several cases.

This atrophy of the soft parts and of the skeleton is always unilateral. It is usually localised to the face, although it may extend to other regions, as will be explained in the description of the clinical forms.

The *facies*, then, is characteristic. The two halves of the face are so dissimilar that they might belong to individuals of different figure and age. The asymmetry is still more obvious when two profile photographs of the patient are compared with one another. The healthy side is that of a perfectly normal individual. It is smooth, and its projections and hollows are harmonious. The affected side, on the contrary, is that of an aged person of smaller stature, wrinkled and wasted, with the skin glued to the bones. The contrast is sometimes so great as to lead one to enquire if the sound side is not swollen, and if it is not the diseased side which is normal. From this it results that when one looks the individual straight in the face the two parts of the visage are separated by a line of demarkation where the features are no longer in correspondence at this level. They are separated by a sharp limit, which resembles the cicatrix left after a sword gash.

The cranium no longer presents a regular ovoid form. It is flattened laterally in the temporo-parietal region, the forehead appears to retreat, although in some subjects the frontal boss appears more prominent in consequence of the atrophy of the subjacent soft parts, at the same time that there exists a veritable gutter starting from the inner angle of the orbit and losing itself in the parietal region. The orbital margin stands out under the teguments, but the thinned and retracted eyelids hide the eyeball, which is, moreover, sunken in the orbit, in consequence of atrophy of the retro-ocular cellulo-fatty tissue. The nose is deflected to the side, and the orifice of the nostril, no longer rounded, but oval and deviated, looks upwards and outwards.

The affected portion of the lips is flattened and thinned. At the level of the upper lip the limit between the atrophic and healthy parts is marked by a furrow, the form and direction of which recall the aspect of hare-lip. Marked

asymmetry of the mouth results from this labial atrophy. On the diseased side the mouth remains half-open, *en sifflet*, the two retracted lips bounding an opening, the height of which diminishes from the labial commissure to the median line.

In some subjects the lips, thus thinned, sink, and may be seized between the teeth during movements of mastication. The skin is flabby, wrinkled, and not only flattened but depressed like a shell, a point that renders more apparent the osseous relief of the lower border of the orbit and the zygomatic arch. The lower jaw, as regards the atrophic moiety, is depressed on the sound side, and the separation is often indicated by a very clear chin-notch.

The ear becomes thinner, its prominences and depressions get effaced, and it assumes the appearance of a cartilaginous sheet, and conveys to the sense of touch a feeling as of parchment.

The contrast between the two halves of the face is accentuated by the changes in the hairy system. The hair on the atrophic side falls out or becomes white. Sometimes, this partial canities forms one of the initial manifestations of the disease. It begins in the parietal region at the same time as the characteristic spot makes its appearance. The canities or the unilateral calvities is usually accompanied by fall of the eyebrows and the eyelashes of the two eyelids, upper and lower, and of the moustache.

Apart from these lesions, which attract immediate attention, others are frequently found in the buccal cavity of the affected side. The alveolar borders are less developed, and the teeth are deviated, arranged irregularly, and no longer come into apposition with those belonging to the corresponding jaw. In other patients we note premature fall of the teeth, although the teeth themselves are not atrophied and remain of the same size as those belonging to the sound side. The half of the palatine vault belonging to the atrophied side is smaller, the concavity of the velum appears to be more accentuated, the uvula is asymmetrical, and cases of atrophy of the tonsil have even been reported. The lingual hemiatrophy, mentioned in several cases, deserves separate consideration in the syndrome which occupies us.

These superincumbent atrophies of the skin, the muscles, and the skeleton, constitute by themselves all the disease: functional disturbances are little marked, sight, hearing, and smell remaining normal; the secretion of the tears and the saliva shows no modification. But in certain cases there are disturbances of sensibility. Pruritus, biting pains, neuralgic crises, and tingling are complained of; sometimes the sensation differs, there is a feeling of permanent tension, of twitching comparable with that produced by contact with a caoutchouc mask or the application of a coating of varnish. Objectively, an abnormal persistence of sensations has been observed, or an exaggerated sensibility of skin surface to the electric current.

The temperature of the affected side is often lowered. The secretion of sweat is diminished, as may be readily proved when the patient is made to take sufficiently violent muscular exercise, or, still better, when pilocarpine is injected. The sudoral reaction of the atrophic area is sometimes retarded or diminished and sometimes absent. These accessory but inconstant symptoms have been reported only in a small number of cases.

Clinical Varieties.

As shown by the description of the most typical cases, facial hemiatrophy is never limited to the face. It almost invariably extends to the cranium, whence the expression "cephalic trophoneurosis" has been substituted for that of "facial trophoneurosis."

Moreover, it does not always present itself under the form from which the classical description is drawn, where we see the whole of one side of the face dry and mummified, contrasting markedly with the other side of the face. There are abortive cases (*des cas frustes*), where the process limits itself to a slight diminution of volume bearing upon the tissues as a whole. Brissaud gives a very clear example of it in the *clinique* devoted to cephalic trophoneuroses. The atrophy was so discrete that the patient was not aware of its existence, and the deformity would escape a superficial observer. It is easy in these cases to differentiate the lesion from a congenital asymmetry, since there exists a characteristic stigma of origin under the form of the cicatrix which invariably accompanies its development.

Apart from these abortive types, there exists a whole series of forms of facial hemiatrophy which are of interest by their typographical selection and by their extent, and which allow us to perceive certain little known modalities of the pathological physiology of the disease.

(1) *Cervico-facial hemiatrophy*.—There are few cases where the muscles of the nape and neck do not participate in the process. The sterno-mastoid, the muscles of the supra- and sub-hyoid regions, the trapezius, and the deltoid itself atrophy, and there may exist between the carotid regions of the two sides a dissimilarity comparable with that seen between the two sides of the face. Sometimes the distant symptoms are much more marked, and the atrophic process may reach the superior extremity.

(2) *Facio-scapulo-humeral hemiatrophy*.—The most convincing example of this condition was found in the case published by Pierre Marie and Marinesco. At the epoch of publication the authors hesitated to class this case as an instance of Romberg's disease, although Brissaud, without hesitation, included it in that group. The patient was a man who, after extraction of a tooth, found that his mouth deviated, and that the left side of his face became the seat of violent pains. In the course of a grave febrile malady, the patient discovered that his facial asymmetry became very manifest, while the left eyelid drooped. The phenomena progressed. Atrophy extended to the left shoulder and left forearm. The authors did not include the disease in any known category, and published the facts without affirming its nature.

Since then, other cases showing participation of the trunk have been published, and there are other observations where facial hemiatrophy has presented curious associations.

3. **Facial hemiatrophy associated with other atrophic lesions.**—Some instances have been published where facial hemiatrophy has been associated with other nervous lesions. We shall see later the conclusions that may be drawn from this fact.

One of Lorentz's patients was seized with left cranio-facial hemiatrophy, together with hemiatrophy of the trunk and the extremities of the right side, thus realising a type of alternate trophoneurosis.

Diller has published a case of facial hemiatrophy coinciding with Jacksonian epilepsy of the opposite side.

Lastly, there are cases—rare, it is true—where there exists a total hemiatrophy of the body, and where the individual appears to be made up of the two halves of different persons (Broca, Orbison). Raymond and Sicard have published interesting observations of the hemiplegic type, where the malady shows itself under two forms: in the ascending form the beginning shows itself in the lower extremity and the atrophy progresses by attaining the superior extremity and the face; in the descending form, on the other hand, the lower extremity is affected last.

Progress.

The characteristic of the disease is to pursue a progressive but extremely slow course. It is not uncommon to see subjects in whom the malady has evolved for forty years, without any accident resulting. Exceptionally, it may present remissions.

Diagnosis.

Typical forms of facial hemiatrophy are easy to recognize. But when it is abortive, the disease may pass unnoticed, and be mistaken for a simple physiological facial asymmetry, although in the latter condition the skin is never attenuated and the osseous deformity is more pronounced, while the contrary is observed in hemiatrophy.

Congenital facial paralysis could scarcely lead to error. It is accompanied by other developmental disturbances.

Scleroderma is more difficult to distinguish, the more so since the co-existence of the two maladies has been reported (Emminghaus, Lépine, Dana, Raymond). The face in scleroderma is more immobile, the aspect is that of a mummy, the skin is more shining, and the face executes its movements with greater slowness.

Pathogeny.

The theories which would limit facial hemiatrophy to a simple lesion of the connective tissue, under the name "laminar aplasia," or to a purely cutaneous lesion, as maintained by Hallopeau, Moebius, and others, have conquered. It must be borne in mind, however, that a certain likeness exists between it and another trophoneurosis, scleroderma. In a case reported by Rosenthal, the lesion, after having resembled scleroderma at the beginning, ended in facial hemiatrophy.

In fact, there is now no dispute as to the existence of a deep trophic disturbance telling upon the tissues, as a whole, and closely connected with a lesion of the nervous system. Perhaps the most interesting point in the history of facial hemiatrophy are the different theories that have been put forward in order to explain and to interpret the malady. For this study touches very closely the question of trophism in general and of its mechanism.

Various nervous lesions have been invoked in the production of facial hemiatrophy. The hypotheses may be reduced to three: 1st, facial hemiatrophy is a consequence of neuritis of the trigeminal; 2nd, it is due to a lesion of the sympathetic system; 3rd, it is the consequence of a central lesion. A certain number of facts may be brought forward in favour of each of these theories.

1st. **The neuritic theory.**—This theory, which was defended at length in Frémy's thesis, obtained its first confirmation in Mendel's case, where interstitial lesions of the trigeminus were found at the autopsy on a patient who had served Romberg for his description of the disease. Analogous cases have been published, but none seems more demonstrative than that of Loeb and Wiesel, who review in their work former cases. In the case reported by these authors the examination of the different layers involved showed atrophy of the dermis, the deeper layers of the skin, and the muscles innervated by the motor fibres of the trigeminus. The nerve was itself the seat of a most characteristic interstitial neuritis. Alterations of the same nature were presented by the Gasserian ganglion, but, beyond that, no change in the roots of the ganglion could be found. This case, then, appears

to be a very clear example of peripheral neuritis, not going beyond the Gasserian ganglion. The condition had followed *accouchement* and was probably of infective origin. Analogous were the cases of Behrend and Boerwald, where the disease was ushered in by lively pain in the sphere of the nerve and had followed a grippe or an angina, evolving after the fashion of a post-infective neuritis. Emminghaus lays particular stress on lesions of the Gasserian ganglion as the cause. Barvinkel looks to Meckel's ganglion as furnishing the cause of the malady.

A certain number of objections have been raised to this theory. There is the absence of disturbances of objective sensibility. It is difficult, say the opponents of the theory, to imagine an elective neuritis localized to the trophic fibres of the nerve, while respecting the sensory fibres. The charge has often been brought against Mendel's observation that the case was published at a moment when *technique* was still imperfect, and the question has been raised if the lesions described by him were not secondary; this objection is answered by Loeb and Wiesel's case. Finally, there remains the character of the progressivity, on which perhaps enough stress has not been placed, and which is exceptional in peripheral neuritis. The last argument, as we shall see later, is not without answer.

2nd. **The sympathetic theory.**—Stilling was the first to maintain the existence of a lesion of the sympathetic system. This hypothesis, opposed by Vulpian, was based upon experimental facts. Brown-Sequard in animals observed atrophy of the face after division of the cervical sympathetic or excitation of the superior cervical sympathetic, or excitation of the superior cervical sympathetic ganglion. Experimenting upon dogs, Angelucci obtained analogous results, and he witnessed a dystrophy of the bones of the skull follow extirpation of the superior cervical sympathetic ganglion. Clinically, Déjerine insists upon the arrested development of the face after operations performed on the trunk of the nerve or its ganglia in young epileptics. Hirsch's case possesses the value of a veritable experiment.—There had been a lesion of the sympathetic by a pistol fired in the mouth, and after the injury, the pupil of the left side was contracted and there was atrophy of the left half of the face.

Attempts have been made to ascertain the exact part of the sympathetic which is affected. Bouveyron, of Lyons, and Barrel in his thesis hold the superior cervical ganglion responsible. *Apropos* two clinical cases where hemiatrophy showed itself in the course of a tuberculous pleuro-pneumonia, they recall the close anatomical relationships that exist between the ganglion and the summit of the pleural dome, and the physiological connections which unite it to the vertebral nerve and to the superior cervical ganglion. The observation of Jacquet who met with a patient with right facial hemiatrophy and with left facial ephidrosis (perspiration) in the course of tuberculosis showed at the autopsy lesions of the inferior cervical ganglion, together with right thoracic lesions. The co-existence between the clinical standpoint of oculo-pupillary disturbances with hemiatrophy has been noted by many observers, as Seeligmüller, Levkovsky, etc. Tournaire in his thesis reports five cases of facial hemiatrophy in subjects affected with radicular paralysis of the brachial plexus.

It is therefore beyond doubt by reason of the course pursued by the sympathetic fibres from the cervical region of the spinal cord, that it is this system which must be ranked as a cause.

Lastly, Chavanne, Lamacq, Graf, Schlesinger, Déjerine and Mirallié, Queyrat and Chrétien have observed facial hemiatrophy in the course of unilateral syringomyelia. That is to place in cause the sympathetic fibres in their intra-medullary origin and to regard their involvement as a consequence of

the lesion of the cervical region of the spinal cord. Such a conception is clearly related to the sympathetic theory, but there are other cases where the central origin of the disease has been considered.

3rd. **The theory of central origin.**—The facts which tend to show the central origin of the malady deserve to be classified. Certain facts are in favour of a medullary origin. Such was the case of Tedeschi where facial hemiatrophy was consecutive to an attack of infantile paralysis, other sequels of which included atrophy of the left leg and optic atrophy. One may well enquire whether in cases of this kind nuclear changes do not play a part.

Claude and Sézary, dealing with a case where they demonstrated lymphocytosis in the cerebro-spinal fluid, ask if it is not possible that the cause is to be sought in a latent meningeal process acting, by compression, on the nerves or ganglia. They compare the existence of this meningeal reaction with that which is found in zona, and they regard the two processes as connected with an analogous mechanism. "Facial hemiatrophy results for them from what is at first a chronic process, often progressive, altering the ganglionic, peripheral, vaso-motor, trophic, and secretory centres of the nerves of the fifth pair, while usually respecting the sensory fibres." And they add: "Lastly, just as there are zoniform eruptions symptomatic of medullary or neuritic lesions, one knows that there exist trophic disturbances of the face symptomatic of sympathetic bulbo-protuberant or neuritic lesions." Brissaud has maintained the same possibility of bulbo-protuberant lesions in order to explain the alternating syndrome observed by Lunz. In regard to Diller's case he asks himself if the co-existence of right facial hemiatrophy and left Jacksonian epilepsy is not the result of a bulbo-protuberant lesion.

May it not be enquired if lesions of the higher centres are capable of bringing into existence the same syndrome? Brissaud asked himself this question when describing atrophy of all the layers of the parieto-frontal region in the course of an ischaemic softening of the brain. Touche at the autopsy on a man, aged eighty years, who when aged twenty-eight years had fallen and fractured the lower jaw and caused a right facial hemiatrophy, found a patch, infiltrated with much modified blood pigment, occupying the motor zones of the left side and covered with thickened and adherent pia mater.

There still remains another argument in favour of the possibility of the cerebral origin of the lesion, namely, the existence of hemihypertrophies comparable with hemiatrophies.

Pathogenic varieties.

If one has followed the discussion of the clinical and anatomical facts and of the pathogenic theories that has been presented, it follows that each theory can show a certain number of incontestable proofs. Facial hemiatrophy, then, should be regarded as a trophic syndrome, which is sometimes of neuritic, sometimes of sympathetic, and sometimes of central origin.

1st.—There are cases of facial hemiatrophy which depend upon a lesion of the trigeminal nerve. These are consecutive to an infective malady, to a traumatic lesion of the nerve, where one finds the changes of interstitial neuritis. Why is the lesion progressive? Is it because the Gasserian ganglion is affected? The fact is probable. But it must never be forgotten that peripheral lesions of this nerve coming on in infancy may be accompanied by trophic disturbances, deep and at a long distance. The experimental proof of that is furnished by the affection described by Klippel under the name of "numerical muscular atrophy" (*atrophie musculaire numérique*), a condition

which has been made the subject of remarkable studies since it was first described by Jacquet, and his pupils Trémolieres and Gallois. After burns, fractures, and contusions, and sometimes even after ulceration of the cornea, when it gives place to facial hemiatrophy, it develops progressively after the initial lesion without there being a connection between its extent and that of the lesion. It is accompanied by rarefaction of the bony tissues, and by atrophy of the eye and of the teeth. There is local hypothermia; the electrical muscular reactions are not altered. This atrophy may be cervico-facial, and extend to the trunk.

Numerical atrophy is the clearest demonstration of the action exerted by a peripheral lesion by reflex mechanism upon the trophic centres which play a part in the nutrition of the tissues. The territory of the trigeminal nerve appears to be peculiarly favourable for these trophic reactions, which appear to be comparable with the distant muscular atrophies described by Charcot after even trifling articular lesions.

2nd.—There are cases of facial hemiatrophy due to lesion of the sympathetic, its ganglia, or its centres. The proof of this is furnished by the experimental fact of Romberg's syndrome following traumatic lesions, and by clinical observations of oculo-pupillary disturbances manifestly caused by the sympathetic.

The appearance of facial hemiatrophy in the course of syringomyelia is the proof of the importance of the spinal cord in these sympathetic phenomena. A curious case reported by Giovanni Morelli shows how much the multiple manifestations of alterations in medullary trophism are neighbours one to the other, since they were found combined in the same subject. The patient was a man of sixty-seven years, who since the age of forty years, had presented the following disturbances: left facial hemiatrophy with recurrent ulcerations of the cornea and vaso-motor phenomena, muscular atrophy of the left superior extremity and sclero-dactylitis, panaris indolens, arthropathy of the left inferior extremity, scoliosis. Do we not find combined in this living museum all the trophic syndromes, syringomyelic disturbances, sclerodermic and muscular atrophy, testifying to a systemic lesion of the trophic medullary centres?

3rd.—There are cases of facial hemiatrophy of central origin. Such are those which take the alternating or the hemiplegic form and which should be contrasted with the contrary forms of systemic hypertrophies. Their existence confirms the action exercised by the brain upon trophism. They lead us to suppose that there exist trophic paths analogous to the motor and sensory paths which, like the latter, intercross, but the tracks of which are as yet unknown.

The study of facial hemiatrophy, then, touches very closely problems concerning the trophic centres and their paths.

The anatomico-pathological study of recent cases appears to be calculated to bring precise data to the solution of the question of trophoneurosis, still so obscure.

Treatment.

Luxemburger recommends a purely æsthetic treatment, which consists in the injection of vaseline beneath the skin of the atrophic regions. A quarter or a half-cubic centimetre is injected, and the masses of vaseline are then modelled. The result is said to be satisfactory. For vaseline, paraffin has been successfully substituted by Mauclair and Menier (of Figeac). This purely palliative proceeding is the only one which can be

adopted in many of the cases. The results obtained by galvanization, however, have been praised by Hoffmann and Claude. In the cases which they have published Claude and Sézary have satisfied themselves as to the favourable action of thiosinamine in causing the resorption of the meningeal fibrous lesions, but, unfortunately, the method is applicable to a limited number of cases only, and on that account is not likely to be widely employed.

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SYDNEY STEPHENSON.

TRANSLATION.

THE SIMPLIFICATION OF TEST TYPES.*

BY

L. DOR

LYONS, FRANCE.

THE article by Dr. Caillaud on test types for visual acuity suggests to me some reflections which I offer for criticism by authorities on the subject.

I am surprised that people persist in devising types which are to be read at 5 metres by means of letters or of signs the size of which is a multiple of 7·3, and the thickness a multiple of 1·46, when it would be so simple to make types to be read at 7m. 30 with letters of a size which would be a multiple of 1, and thickness a multiple of 0·2.

If the latter method were adopted, it would be quite simple to construct extemporaneously a set of test types for all required circumstances, and one could utilise all the square letters of journals or of advertisements which happen to fulfil the requirement that they shall have for thickness the fifth of their height.

A letter 2 cm. high by 2 cm. broad, read at 7m. 30, would correspond to an acuity of 1/2, a letter of 10 cm. to an acuity of 1/10, etc.

Of course, one's room does not measure 7m.30, but it is only necessary to employ reversed letters and to place them upon a card at 3m.30. from a mirror, the observer being placed at 70 cm. behind the card, *i.e.*, at 4m. from the mirror, and reading the letters in the mirror. One could adopt also the distance of 3m.65, and in this case take as an acuity of 1 characters five millimetres in size and as an acuity of 1/2 characters of 1cm.

The distance of 5 metres has been chosen in an absolutely arbitrary manner; from the scientific point of view, it corresponds to nothing, and it forces the makers of optometric types into complicated calculations. More than that, it imposes on the oculist the obligation of having the types, and renders it impossible to estimate the visual acuity if one does not happen to have one's test types at the moment. It is, on the other hand, quite easy, in the country or elsewhere, to measure out 7m.30., and to make letters of 2, 4, 6, 10, 20, centimetres in height and width, with a fifth of that in thickness. In this manner it is possible to estimate the visual acuity as precisely as in one's own house, and to vary the letters to any extent, so as to have all the degrees of acuity which one may happen to want. For myself, I have had some letters made of 50 cm. in height, others of 25cm., and I am thus able to note acuities of 1/50 and of 1/25 with precision. By putting my patients at 3m.65 I get an acuity of 1/100 and 1/50 and my notes are more precise than if I registered the distance at which the patient could count fingers. I have often had the satisfaction of being able to note acuities

*Translated from *La Clinique Ophthalmologique*, 10 novembre, 1910.

varying between $1/20$ and $1/100$. On the other hand, I have some types which go up to $V.=2$ by stages of $V.=1, 1.2, 1.6$, and 1.8 ; and for people who have hawk-like sight that is an advantage. ERNEST THOMSON.

CURRENT LITERATURE.

NOTE. Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—DYSTROPHIA EPITHELIALIS CORNEÆ.

Fuchs, E.—*Dystrophia Epithelialis Corneæ*. (*Dystrophia epithelialis corneæ*.) von Graefe's *Archiv f. Ophthalmologie*, Bd. LXXVI, 3 Heft, 30 August, 1910.

Under the name *Dystrophia epithelialis corneæ*, Fuchs, of Vienna, groups a class of cases, which, although rare, have been seen by most oculists, but which have not hitherto been recognised as belonging to a fairly well characterised class, to which Fuchs now proposes to give this fairly comprehensive name.

The disease affects only elderly people, mostly women; sometimes both eyes but sometimes only one eye become affected. The first symptom is diminished corneal sensibility; then follows the opacity, the formation of which is sometimes, but not always, accompanied by local irritation. The opacity is superficial, diffuse to the naked eye, most marked in front of the pupil, and without well-defined borders. As a rule, it extends farthest downwards; the surface of the cornea is blurred and rough, cloudy and gelatinous, and displays distinct vesicles or small dark spots which correspond to tiny cavities within the epithelium, but the opacity is not entirely confined to the epithelium, for after removal of the latter, the cornea generally reveals a slight superficial haze. The cornea of the unaffected eye is often, too, insensitive to touch. The deeper parts are mostly normal, with exception of some cases where glaucoma supervenes, but this is by no means the rule. The corneal opacity increases, slowly, but steadily. In the end we find a dense opaque portion, just in front of the pupil, which is slightly prominent over the periphery. Vision is then reduced to the counting of figures at quite a short distance. Fuchs was able to examine a portion of a cornea microscopically at this stage; it had been removed by the corneal trephine. There was a thick layer of newly-formed tissue between the epithelium and Bowman's membrane; it was very similar to corneal tissue, and even displayed a homogeneous structure in the front, as if a new Bowman's membrane had there been formed; no signs of inflammatory infiltration. The epithelium was thin, irregular, and showed in some places small vesicles, while it had, in patches, detached as a whole from its base. The ætiology of the disease is unknown, and treatment is unfortunately unable to arrest its progress.

R. GRUBER.

REINER AND KEELER, Ltd., Prescription Specialists.

A new lens for myopia has been designed for the purpose of obtaining better definition at the periphery of the visual field of a myope, together with freedom from distortion, whilst retaining the form and appearance of a practical lens unlike those of the Steinheil cone type.

It consists of two components in contact at their edges — the one nearest the eye being a crossed negative lens with the higher curve in, and the outer component a meniscus concave with the convex surface out. The air space between them takes the form of a crossed convex lens. The lens is mounted in the usual way either in rimmed or rimless spectacles or eyeglasses, being *thinner and lighter* than an ordinary lens of the same power.

As this lens is the result of careful calculation in every individual case, it is possible, where desirable, to equalize or approximate dissimilar images without altering the dioptric power.

It is also possible to provide a certain amount of enlargement of the retinal images without having resource to the telescopic type.

The Projection Lamp has been now modified in consequence of the difficulty experienced with small lamps and the use of a battery. It is now made for use with lamps of any voltage with only a slight addition to the size.

The Edridge-Green Color Perception Lamp has been slightly altered as regards the Index to bring it into conformity with Dr. Edridge-Green's last edition of "Color Perception, &c." Existing lamps may be altered at a nominal charge.

The Edridge-Green Classification Test Direction have also been revised and a copy which can be inserted in the box may be obtained free upon application.

II.—VARIX FORMATION ON THE OPTIC DISC.

- (1) Knapp, P.—A case of varix formation on the papilla. (Ein Fall von Varicenbildung auf den Papillen.) *Zeitschrift für Augenheilkunde*, April, 1910.
- (2) Fuchs, E.—Varix formation on the papilla. (Varicenbildung auf der Papilla.) *Zeitschrift für Augenheilkunde*, Juni, 1910.

(1) The coloured plate which accompanies this article by Knapp, of Basel, shows the varicose condition of veins upon the papilla, and the other abnormalities in the retinal veins which were found in the author's case.

T. HARRISON BUTLER.

(2) Fuchs, of Vienna, commenting on the case published by Knapp in the *Zeitschrift* for April, in which varices were formed on the papilla, figures a case of his own, in which similar loops of varicose veins were formed on the papilla after thrombosis of the lower main branch of the central vein. Fuchs thinks that the sudden ending of a vein in Knapp's case is caused by a communication with the choroidal vessels following the revascularization of an area which has been injured by a large hæmorrhage.

T. HARRISON BUTLER.

III.—DERMOID TUMOURS.

- (1) Bourgeois.—Dermoid of the cornea and sub-conjunctival lipoma. (Dermoïde de la cornée et lipome sous-conjonctival.) *L'Ophtalmologie Provinciale*, T. II, p. 178, février, 1906.
- (2) Trousseau.—Dermoid of the conjunctiva and cornea. (Dermoïde de la conjonctive et de la cornée.) *Ann. d'Oculistique*, T. CXXXVII, p. 218, mars, 1907.
- (3) Calderaro.—A dermoid of the lower lid. (Dermoide della palpebra inferiore.) *La Clinica Oculistica*, January, 1908.
- (4) Levitt, Marcus J.—A case of dermoid tumour of the conjunctiva. *New York Medical Journal*, 18th July, 1908.

(1) Bourgeois records the two following cases.—(1) A large dermoid covering the lower half of the cornea treated by abscission of the prominent part of the tumour, followed by electrolysis of the remainder under cocain anæsthesia. For the latter he used an iridio-platinum needle attached to the positive pole of the battery, the negative pole being connected with a moistened electrode held against the temple. The current employed did not exceed 5 milliamperes and intervals of 6 to 8 days were allowed between the applications, each of which lasted one minute. (2) Spasmodic contraction of the left eyelids and the muscles of the left side of the face cured by removal of a sub-conjunctival lipoma.

(2) Trousseau's patient, a girl aged 14, was born with a tumour of the left eye, which was removed when the child was 14 months old, but recurred. When seen by him in October, 1906, there was a bright-red tumour of soft consistence, 12-13 mm. high, 18-20 mm. broad, and 9-10 mm. thick, situated

on the lower and outer third of the cornea and the neighbouring part of the conjunctiva. This had a rounded smooth surface, on which a few hairs could be seen. Basing his diagnosis upon the congenital origin, the situation, and the presence of hairs, the author came to the conclusion that, in spite of the size, softness, and red colour, the tumour was a dermoid, rather than a lipoma or a malignant neoplasm, and excised it. Although the anterior chamber was emptied in attempting to dissect out a very hard portion of the growth, which penetrated deeply into the cornea, the healing was satisfactory, except that three weeks after the operation, a red projecting growth formed over the eyeball. This was removed, and its base was cauterised, but it was found to consist of granulation tissue only. Microscopic examination of the main tumour showed that although there were hair follicles and reduced sebaceous glands present, these were very few in number, and in the deeper parts the tissue was thick and fibrous, and permeated by numerous vessels. The author considers that the histological structure resembled that of a vascular fibroma more closely than that of a dermoid.

(3) A case of dermoid of the lower lid, and the microscopical examination thereof.

HAROLD GRIMSDALE.

(4) **Levitt's** (Brooklyn, New York, U.S.A.) case is particularly interesting, because the patient had no other abnormality, and by reason that the growth had been under observation almost from birth.

C. A. OLIVER.

IV.—CHOKED DISC.

Parisotti.—Choked disc. (*Papilla da stasi*.) *Rivista Italiana di Ottalmologia*, February-August, 1910.

In this paper **Parisotti**, of Rome, aims to establish the proposition, that "choked disc (*papilla da stasi*) from cerebral tumour makes its appearance earlier, and assumes larger proportions, the more the tumour interferes with the circulation in the ventricles."

With this in view, he gives, in more or less detail, an account of a number of cerebral tumours, some of which were associated with "choked disc" and some were not, and endeavours to substantiate his point from the anatomical findings at the autopsy.

He then deals in succession with the theories of causation which have been put forward to explain the phenomenon, beginning with that of von Graefe, who attempted to refer the changes in the nerve to vascular stasis. This was soon shown, both by anatomical and pathological examination, to be unfounded. The communication between the deep orbital veins and the facial system is so free that vascular stasis is an impossibility. Manz suggested excess of intracranial pressure as a cause; and this is at least possible. Leber and Deutschmann attributed the process to an alteration of the metabolism due to the presence of the tumour—in fact, to an auto-toxaemia.

"In discussing these various views," we must, says Parisotti, "know exactly where we are standing," and therefore he draws attention to what he considers a most fertile source of confusion. He writes:

"I believe that I am rendering a service both to ocular and to cerebral pathology in insisting here on the necessity of distinction between choked disc and optic neuritis, because the former is the effect of a purely mechanical, hydraulic cause, and the latter is a purely inflammatory condition, which may arise without any alteration in the fluid pressure." That there is a distinction is shown by the fact that intense "choked disc" may exist with little or no functional disturbance; while, on the other hand, great visual failure may be

occasioned by a trifling alteration of the nerve. The resistance of the nerve tissues to pressure is always considerable, but varies in different individuals; this accounts for the varying intensity of the symptoms. On the other hand, the optic nerve is very sensitive to toxic action, and has little resisting power.

It is not uncommon for nerves, the seat of hydraulic congestion, to be attacked by some toxin; but when this does not happen, the nerve may retain all its conductive power, and the vision remain normal, although the nerve has the appearance of atrophy.

The characteristic feature of choked disc is the swelling, *i.e.*, the elevation of the papilla; this is the cardinal symptom by which we separate the two conditions of choked disc and optic neuritis. Apart from the "choked disc" due to hydraulic disturbance, there is a similar condition, which is rarely seen, and is due to infective processes. This is an inflammatory œdema; the true *papilla da stasi*, on the other hand, is due to the excess of fluid forced into the intervaginal spaces of the nerve. The tissues are dilated, but are otherwise indifferent to the fluid.

In the cases of œdema, the infective element is everything; true choked disc, on the other hand, though it may be complicated by the infective element, which increases its effect, yet often runs its course without any such infection."

HAROLD GRIMSDALE.

V.—MUCOUS PATCH ON THE CONJUNCTIVA.

Antonelli, A.—Mucous patch on the limbal conjunctiva. Secondary syphilis of the conjunctiva. *Annales des Maladies Vénériennes*, octobre, 1909.

In Antonelli's patient, a woman aged nineteen years, who had been treated for chancre and secondary manifestations at the Hospital St. Louis, by Professor Graucher, the diagnosis could be made at a glance, but it was also confirmed by the resemblance which existed between the conjunctival *plaque* and a *plaque* which was present on the edge of the tongue on the same side as the affected eye. There had also been a mucous patch at the orifice of the left nostril, associated with the escape of sanious discharge from the nose. The ocular lesion, which was situated on the temporal side of the limbus, was of reniform outline, with its concave border along the edge of the cornea, measuring about 8 mm. in height and 5 mm. or 6 mm. in its greatest width. The ocular conjunctiva was very hyperæmic. The base of the patch was of greyish, dirty-white colour, slightly elevated, and almost of diphtheritic aspect. Examination with the ultra-microscope of the magma obtained by scraping the ulcerated conjunctival surface did not disclose the treponemata, but, then, the lesion had already existed for some days, and the patient had received several injections of mercury benzoate. At the end of three weeks, the conjunctival patch was almost completely healed, but the eye presented an iritis, which was severe and rebellious to treatment.

Après this case, Antonelli discusses the secondary lesions which may manifest themselves upon the ocular mucous membrane. He insists upon secondary syphilitic conjunctivitis (more common than usually thought) under the simple catarrhal form, analogous to the pharyngitis well known by the older writers under the name of "syphilitic angina." An infantile syphilitic conjunctivitis, in cases of heredo-syphilis, has also been noted. The pseudo-granulous form of syphilitic conjunctivitis appears to be

much less common, and may be said to represent a form transitional towards specific tarso-conjunctivitis.

As to syphilides of the conjunctiva, such manifestations are rare relatively to their frequency on other mucous membranes, a fact probably explained by the biology of the spirochæta and by the special conditions of the ocular mucous membrane, its usual microbic flora, its irrigation by the tears, the absence of irritation, etc. The most frequent ocular syphilides are those which involve at the same time the edge of the eyelids and the contiguous mucous membrane: syphilides of the commissures, fissured, ragadiform, or of the bilabial type or resembling a horse-shoe. Upon the bulbar conjunctiva papules or papulo-ulcerous syphilides appear to be more frequent than true mucous patches; but the diagnosis is often doubtful, and hybrid forms are numerous. In any case the bulbar conjunctiva is more frequently the seat of papules than is the palpebral surface or the *culs-de-sac*. Conjunctival papules constituted by the mucous membrane itself, thickened and raised, may be displaced with the conjunctiva, a point whereby they are distinguished particularly from episcleritic nodules. They generally take the form of small lenticular papules, of rose colour, with clear borders, hard consistence, and without any great tendency to ulcerate. Their colour is sometimes coppery (*cuivrée*) or greyish-red; the conjunctival reaction is moderate; the subjective disturbances are slight; and the prognosis is very good. Mucous patches, properly so-called, are rare upon the bulbar conjunctiva under the form of slightly goffered elevations, with clear, rounded, and non-sinuuous borders, and of an opaline or greyish colour, sometimes with a tendency towards yellow. The association of ocular syphilides with buccal syphilides is almost the rule: and iritis, concomitant or consecutive, is frequent. Prognosis is favourable. The sole exception is that mucous patches involving the edges or the commissures of the eyelids or the lacrymal caruncle may become ulcerous, and in that way deform or deviate the ciliary border, evert the lacrymal punctum, destroy the follicles of the cilia, or, rarely, provoke symblepharon. The differential diagnosis from precocious *tertiarisme* of the ocular adnexa (malignant or galloping syphilis of old people, of alcoholics, etc.) is important, since gummatous tarso-conjunctivitis, scleritis, or episcleritis, occurring in diffuse gelatinous form, exact a much graver clinical signification, as well as a much more reserved prognosis.

SYDNEY STEPHENSON.

VI.—LESIONS OF THE OPTIC TRACTS IN CEREBRO-SPINAL MENINGITIS.

Terrien and Bourdier.—Lesions of the optic tracts in epidemic cerebro-spinal meningitis. (*Lésions des tractus optiques dans les méningites cérébro-spinale épidémiques.*) *Archives d'Ophthalmologie*, avril, 1910.

Terrien and Bourdier have recently had the opportunity of examining the optic nerves in three cases of cerebro-spinal meningitis when death took place in the first week of illness. They observed that "the main stress of the lesions fell on the nerve sheaths, which were nowhere normal, the vaginal spaces were dilated, especially close to the globe and filled with a considerable amount of cellular infiltration and thickened septa which bound the arachnoid to the pia mater. The dural sheaths were scarcely free." Reference is made to

the variations in description of the ocular lesions of the disease, and with regard to neuritis, the authors consider that it is impossible from the present records to decide whether it is due to a primary descending infection or a peripheral one, or if secondary to other lesions, such as intra-cranial hypertension or internal hydrocephaly.

From their own observations they draw the following conclusions.—That the meningeal infection is propagated along the sheaths of the optic nerve at the same time and in the same way as in the brain or cord; that it is a local reaction which has been isolated artificially from the main processes which have invaded all the envelopes of the cerebro-spinal axis.

It is explained at the outset by an arachnoiditis which may go on towards a cure or else produce grave disorders in the optic tracts. The process affecting the optic nerves is not therefore a neuritis, properly speaking, but a diffuse optic perineuritis extending the whole length of the tract. Usually, the nerve itself is normal, but in some cases there is produced a secondary interstitial neuritis, which tends to cause disappearance of the nerve fibres and to produce optic atrophy.

The different stages which may be found correspond to the variations seen ophthalmoscopically. Thus, the hypertension in the vaginal space produced by the dilatation of the sheaths, the very intense reaction of the pia mater, its invasion by capillaries of new formation, correspond to the two stages of papillary hyperæmia and of slight papillitis, as has been frequently noted by the authors at the onset of the disease. Further, the lesions invading the nerve correspond to the picture of optic neuritis and are as rarely found.

Certain cases of amaurosis without ophthalmoscopic lesions have been referred to cortical lesions (Axenfeld, Uhthoff) or to retro-bulbar neuritis. The authors offer as a possible explanation the occurrence of areas of intraparenchymatous infiltration abolishing the function before causing finally the death of the nerve and a regeneration of axis-cylinders in the cases where a reappearance of vision has taken place. They have, however, no proof of this hypothesis.

The histological process is that of a lesion primarily of the sheaths of the optic nerves—it is an optic meningitis or diffuse perineuritis with a tendency to the formation of areas of intraparenchymatous infiltration. This perineuritis appears to go on less often to atrophy than does neuritis, generally speaking, and a more favourable prognosis can therefore be given. In this stage it can retrogress and clear up without sequelæ or create by secondary complications an interstitial neuritis, which, by extension through the whole nerve, may go to optic atrophy.

BERNARD CRIDLAND.

VII.—OPHTHALMOMALACIA.

Chesneau.—Acute unilateral ophthalmomalacia and enophthalmos in a case of Basedow's disease of ten years' duration. (*Ophtalmomalacie et enophthalmie monolatérales aiguës dans une maladie de Basedow datant de dix ans.*) *Ann. d'Oculistique*, mai, 1910.

Chesneau's patient, a woman aged 58, first developed symptoms of exophthalmic goitre in 1898 when they were rapidly relieved by treatment with salicylate of soda. In 1901 she had a relapse, and her vision was reduced

in both eyes, owing to sclerosis of the lenses. The general symptoms again yielded to treatment, but the exophthalmos remained uninfluenced. In February, 1908, the exophthalmos was unaltered, and the cataract was getting worse, but the general symptoms were slight. There was no alteration noticed in the condition from that date until January, 1910, when the patient suddenly developed feebleness in the legs, with severe vertigo. At the same time she suffered from painful photopsia and a dense mist in front of her right eye, which diminished in size, and fell back rapidly into its place in the orbit. This history was confirmed by careful enquiries. When seen by Chesneau two days later, the left eyeball was still prominent, but the right had not only receded to its normal position, but even appeared to have sunk into the orbit, while the palpebral aperture seemed visibly narrowed. The tension was so reduced that the eye felt like a slack pocket, but it retained its spherical shape. The pupil was somewhat smaller than that of the left eye and was inactive to direct stimulation but active consensually. The vision was reduced to hand-movements, and ophthalmoscopic examination was impossible owing to the cataract. There was no fundus reflex in either eye, and both irides were tremulous. Treatment by Faradization caused temporary improvement in the tension, but, finally, the eye settled down in the following condition.—Position apparently normal, lids open normally, palpebral aperture slightly enlarged by 5% cocaine, globe soft with normal movements, pupil inactive, size 2.5 mm. reduced to 1.5 mm. in 20 minutes by a drop of 2% solution of pilocarpine nitrate, increased by atropine to 5 mm. only, which was the mean diameter of the right pupil: Graefe's sign not marked, sensation of skin and cornea normal, no hyperæmia, no difference in temperature in conjunctival *culs-de-sac* on the two sides, no difference in colour on two sides of the face, and no pain on pressure over the supra- or infra-orbital nerves.

The author comments on the resemblance between the symptoms of his case and those of Horner's syndrome (narrowing of the pupil and palpebral aperture, retraction of the eyeball, diminished tension, and visual trouble, conjunctival hyperæmia, and lacrymal hypersecretion) which is admitted to be due to paralysis of the cervical sympathetic, and refers to some cases of exophthalmic goitre with unilateral symptoms. He discusses the possible explanations of the sudden disappearance of the proptosis, and expresses the opinion that the protrusion is caused by the action of the muscle fibres in the check ligaments rather than by excess of fluid in the orbit, and that its sudden disappearances were due to interference with their innervation from the sympathetic.

R. J. COULTER.

VIII.—ELECTRIC CATARACT.

Robinson.—Cataract resulting from electric shock; being a brief review of the literature, with a report of three cases. *Ophthalmic Record*, April, 1910.

Robinson (Duluth, Minn.) describes three cases of cataract following electric shock from industrial currents.

The first case, a man, aged 31 years, received a current estimated at 13,000 volts. Blurring of sight was noticed a month later, and when he came under observation, six months after the accident, his vision was R.=20/40 \bar{c} + 2D. J. 1 with difficulty \bar{c} + 3.5D. Field slightly contracted. L.V.=20/30 and

J. 1 with difficulty. The right lens showed numerous fine greyish dots, the majority of which were confined to the anterior cortex, some being strictly subcapsular. These points were discrete in the central area and arranged in pyramid-like clusters at the equator. A similar condition, but in a minor degree, was seen in the left lens. Two months later, R.V. = 20/200 not improved. A year after the accident, the points had become arranged in rosette form R.V. = 15/200, and three months later, the opacity was complete. After needling and linear extraction of the lens, R.V. = 20/20 with correction. The opacities in the left lens remained stationary during the two years the case was under observation. L.V. = 20/40.

The second case, an electrician, received a current at 26,000 volts through his body. He was unconscious for two days. Vision was noticed to be dim soon after the accident. When seen sixteen months later, vision in each eye was 20/50, both lenses clear; the vitreous in each eye was decidedly hazy, but this cleared up under treatment. Eighteen months after the accident, a diffuse haziness of the lenses appeared, and the cataracts rapidly developed and were needed a month later. Result: R.V. = 20/20, with correction. L.V. = 20/30, with correction.

In the third case, a man, aged 53 years, was knocked down by a current at 500 volts from a street railway, but resumed his work in a few minutes. He had a burn of the right malar, and pain and tenderness over the right mastoid, with a moderate degree of deafness and tinnitus and right partial ptosis, which disappeared in six months. Blurring of sight was complained of at the time of accident, but he was not examined by an oculist till eighteen months later, when R. V. = 20/30 and J. 1 with presbyopic correction. L. V : 20/50 and J. 14 with correction. There was a sharply-defined opacity at the nasal edge of the right lens, chiefly capsular, and about 2 mm. in width. The left eye showed a moss-like floating opacity in the anterior part of the vitreous. The central part of the lens was clear, but there were peculiar bluish-black spots almost encircling the equator. These remained stationary for six months.

The first case is regarded as a fairly typical electric cataract: *Cataracta punctata electrica*. The second is peculiar, owing to the lapse of time between the accident and the development of the cataract. The third is a case of ptosis and vitreous opacities from electric shock. The cataract may possibly be the result of other causes.

As to the pathogenesis of cataract from electric shock, it has been assumed by Yvert that it is due to minute ruptures of the capsule; by Leber, to albuminous coagulation; by Knies, to powerful contractions of the ciliary muscle; by Vossius, to recurrent iridocyclitis; and by Widmark and Silfast to the effects of ultraviolet rays. Hess, however, has shown (1888) that in animals there is a gradual death of the cortical lental cells after electric shock. There is also chemosis of the conjunctiva, often cloudiness of the cornea, ischæmia of the iris, and myosis (mydriasis if there is loss of consciousness); exudation into the anterior chamber, marked congestion and swelling of the ciliary processes, and minute hæmorrhages into Petit's space. In the course of an hour or two, cloudiness of the lens appears at the equator, and especially in the area where the ciliary hyperæmia is most marked. Microscopically, it was shown that a mass of dead anterior capsular epithelium becomes separated from the capsule by a flaky albuminous substance, or the cortical fibres become separated from the epithelium by a quantity of fluid. Similar changes are seen in the posterior cortex, and the lens fibres show a tendency to vacuole formation.

In his review of the literature, the author could find only four cases of

cataract due to shock from industrial current, and 32 from lightning, notwithstanding the fact that an exhaustive account of ocular injuries from lightning was given by Charles de St. Yves, in 1722. When lightning cataract appears immediately, it is regarded as a concussion cataract; when delayed, it belongs to the type of secondary degeneration which is found after industrial accidents.

In some of the latter cases the opacities have cleared up again. In nearly half the cases recorded, the type has been "dotted," "flecked," or "punctate" at one time or another in the course of the disease, and this is therefore regarded as the *typical* electric cataract. Other forms recorded were "*demi-dure*," "anterior polar," "posterior cortical," a broad stripped opacity on one side and a large posterior polar stellate on the other. Some remain stationary for 6 or 7 years, whilst others become complete in a few months.

Other complications recorded are chemosis, corneal opacities, ptosis, cycloplegia, paralysis of the dilator pupillæ, paralysis of extra-ocular muscles, spasm of accommodation, iritis and iridocyclitis, hypopyon, choroiditis, retinitis, rupture of the choroid, retinal hæmorrhage, and atrophy. The author might also have mentioned detachment of the retina. Cataract does not necessarily follow severe electric injury to the eye, and cases in which several of these complications have been noted without cataract are referred to in this paper.

J. JAMESON EVANS.

IX.—OPHTHALMOPLÉGIA.

- (1) **Pasetti and Salani.**—Progressive family nuclear ophthalmoplegia externa. *Annali di Ottalmologia*, Vol. XXXVI, 1907, Fasc. 3-4, pp. 281 to 295.
- (2) **Jessop, Walter H.**—Bilateral ptosis and ophthalmoplegia externa. *Transactions Ophthalmological Society U.K.*, Fasc. 3, 1909.
- (3) **Fernandez, Francisco M.**—A case of total ophthalmoplegia. *Medical Record*, 11th December, 1909.
- (4) **Batten, F. E.**—Note on a case of bilateral ophthalmoplegia externa in an infant. *Transactions Ophthalmological Society U.K.*, Fasc. 2, 1910.
- (5) **Russell, J. S. Risien.**—Discussion on the diagnostic values of ophthalmoplegia, partial and total. *British Medical Journal*, 29th October, 1910.

(1) **Pasetti and Salani**, of Florence, give the bibliography of published cases of progressive family nuclear ophthalmoplegia externa, and add a very instructive case which supports Oppenheim's hypothesis—namely, that congenital malformation of the nuclear apparatus determines, after some time, the complete functional defect.

A. ANTONELLI.

(2) In the case reported by **Jessop**, of London, that of a girl of 5 years, with a family history pointing to tubercle, bilateral ptosis and ophthalmoplegia came on in the course of five days. Three days after having had attacks of choking and cyanosis, the child was found dead. *Post-mortem* examination refused. **F. E. Batten** (of London) discussed the possibilities in this case, and concluded that there had been either a tuberculous growth affecting the corpora

quadrigemina, and extending backwards, or a polio-encephalitis, which had picked out the cranial nuclei.

ERNEST THOMSON.

(3) **Francisco Fernandez'** case of total ophthalmoplegia was, apparently, nuclear, and was supposed to be syphilitic in origin. The latter point, however, remained unproved, owing to the patient's disappearance after a week of treatment.

ERNEST THOMSON.

(4) **F. E. Batten's** case of complete paralysis of all the muscles supplied by the third nerve in the right eye, and almost complete paralysis of the same muscles in the left eye was an infant, ten months old, who first showed a squint at seven months. The pupils were unequal (left the larger) and sluggish. The discs were not atrophic. There was weakness of the right arm and leg, with constant rhythmical movement. Tubercle bacilli were found in the cerebro-spinal fluid. von Pirquet reaction was positive. The paralytic symptoms progressed, and the child died six months after the onset of the first symptoms. At the autopsy, a large tuberculous mass was found on the surface of the cortex in the left occipital region, and a large tuberculous tumour in the region of the optic thalamus and corpora quadrigemina. The symptoms, which have not been given fully in this abstract, were due to the latter lesion. From the symptoms, and from the examination of the cerebro-spinal fluid, it had been possible to make an accurate diagnosis of the situation and nature of the lesion.

ERNEST THOMSON.

(5) **Risien Russell**, of London, at the annual meeting of the British Medical Association in London, opened the discussion upon the diagnostic values of ophthalmoplegias. His remarks are worthy of careful study, bearing, as they do, upon a class of defect which is frequently forced upon the attention of ophthalmic surgeons. The speaker regarded paralysis of any ocular muscle, or group of muscles, as a certain sign of organic disease. But care must be taken that the deviation is really due to paralysis and not to spasm, such as is common in the nystagmus of Thomsen's disease. Paralysis of an eye muscle not only postulates an organic lesion, but excludes many varieties of organic disorders of the nervous system, among them diphtheritic paralysis in which ophthalmoplegia externa is not found.

The mode of onset of paralysis is no reliable guide to the underlying disease. In insular sclerosis, paralysis is often sudden in onset, and may be transient in nature.

It is doubtful whether we can rely upon the significance of certain groups of ocular paralysis in the localisation of the causal lesion in the medulla.

The speaker asked whether the phenomenon of reflex iridoplegia can be held to be pathognomonic of the parasyphilitic affections and general paralysis.

In the discussion which followed, **Farquhar Buzzard**, of London, said that the importance of the Argyll Robertson pupil in the diagnosis of syphilitic and parasyphilitic disease could hardly be over-estimated. He emphasised the fact that the abolition of the light reflex, either unilaterally or bilaterally, often meant that there was a lesion of the third ventricle. When the sign was added to the classical signs of cerebral tumour, it was useless to operate, for the growth would be found to be too deeply seated for removal. **Bishop Harman**, of London, said that extreme cold often caused paralysis of a rectus comparable to Bell's palsy. This might rapidly disappear. The President (C. Higgins) agreed with the speaker. T. HARRISON BUTLER.

X.—THE EYE AND SYNTHETIC COMPOUNDS OF ARSENIC.

- (1) Faber, E., and Starcke, A.—Atrophy of the optic nerve from trypanosomiasis, or from the use of atoxyl, or from frambæsia. *Ned. Tijdschrift voor Geneeskunde*, 1908, I.
- (2) Birch-Hirschfeld, A., and Koester, G.—On injury of the eye by atoxyl. von Graefe's *Archiv f. Ophthalmologie*, 30 August, 1910.
- (3) Henderson, F. L.—Blindness due to the administration of synthetic arsenical compounds. *Amer. Jour. Ophthalmology*, November, 1910.
- (4) Clarke, Ernest.—Optic atrophy following the use of arylarsonates in the treatment of syphilis. *Trans. Ophthalmological Society U.K.*, Vol. XXX, Fasc. 3, 1910, p. 240.

(1) A patient, suffering from sleeping sickness acquired in the Congo, whose cerebro-spinal fluid contained trypanosomes, was treated with injections of atoxyl. In eight months, about ten grammes of atoxyl were injected. The patient was well after that time, but he now complained of bad sight, which was found to be due to bilateral atrophy of the optic nerve, with considerable contraction of the fields. Atoxyl was no longer given, and vision first became still worse, but after some months, grew better, although the contraction of the fields remained constant. The question arises, was this atrophy of the optic nerve due to the sleeping sickness, or to the atoxyl, or to frambæsia, from which the patient had suffered before? The authors cannot give a certain opinion, but are inclined to make the trypanosomiasis responsible, because this infection is known to attack different parts of the eye. They think, after all, that the patient owes his recovery from the sleeping sickness to the atoxyl, albeit with a moderate degree of atrophy of the optic nerve. G. F. ROCHAT.

(2) This paper, by **Birch-Hirschfeld** and **Koester**, of Leipzig, is based on the clinical history of two cases—one of which was examined anatomically—on a critical review of all the cases hitherto reported (thirty-six), and on the experimental researches of both authors. It is to be hoped that the clinical supply of cases will now give out. Atoxyl is extremely dangerous, even in the very smallest doses, and no possible precaution will ever make it safe, while the prognosis, after the first appearance of any visual symptoms, is hopeless. The anatomical examination of Birch-Hirschfeld's case is the more interesting as only one other has been previously reported (Nonne), which presented considerable differences, probably because it belonged to an earlier stage. The changes in the present case referred mostly to the optic nerve fibres from the ganglion layer of the retina up to the corpus geniculatum internum (third neuron), and there were also degenerative changes in the nuclear and internuclear layers. The nuclei of the rods were more affected than those of the cones. Clinically, the fact was again noticeable that the pupils preserved a certain amount of reflex contractibility even after the amaurosis was completely established, contrary to the ordinary condition in optic atrophy. Abuse of alcohol seems to be a predisposing factor.

The following table, compiled by the authors, reproduces the most important characters of the different types of toxic amblyopia.

	Clinical character.	Central field.	Peripheral field.	Fundus.	Prognosis.	Pathological anatomy.
Alcohol and Tobacco	Chronic amblyopia	Central scotoma for red-green	Normal ...	Temporal decoloration of O.D.	Favourable	Degeneration of papillo-macular fascicle, secondary proliferation of glia.
Methylated Alcohol	Acute amaurosis	Central scotoma sometimes	Contracted	O.D. injected and blurred or negative	Unfavourable	Degeneration of nerve fibres and ganglionic layer
Carbo-Sulphide	Chronic ...	Absolute central scotoma	Free ...	Redness of O.D. decoloration or normal	Favourable	Probably degeneration of nerve after cerebro-spinal lesion.
Thyroidine	Chronic ...	Central scotoma	Free ...	Hyperæmia of O.D. later atrophy	Favourable	Degeneration of ganglionic layer with atrophy of nerve fibres.
Lead ...	Chronic or acute	Central scotoma in some cases	Free or contracted	Negative or vascular changes or retinitis albuminurica	Dubious ...	Direct action upon O.N., retina, and vessels
Extractum Filicis	Acute ...	No scotoma	(?)	Negative or pale disc or contraction of vessels	Dubious ...	Destruction of nerve fibres, œdema of nervous layer and atrophy of ganglionic layer.
Quinine ...	Acute amaurosis or amblyopia	Very rarely central scotoma	Concentric contraction	Contraction of retinal vessels	Favourable	Disturbance of retinal circulation, besides direct action upon ganglionic layer.
Iodoform ...	Acute amblyopia	Generally central scotoma	Mostly free	Sometimes optic atrophy	Dubious ...	(?)
Arsenic ...	Generally in chronic poisoning	Central scotoma	Free ...	Retinal hæmorrhage and œdema	Favourable	Probably direct nerve lesion.
Aniline ...	Chronic amblyopia	Central scotoma	Sometimes contracted	Optic neuritis and violet appearance of fundus	Favourable	(?)
Atoxyl ...	Acute onset and rapid progress	No central scotoma	Extreme contraction	At first negative then optic atrophy	Unfavourable	Degeneration of optic nerve and retina.

(3) **Henderson**, of St. Louis, adds one more to the list of cases of blindness from the use of arsenical preparations. The drug which had been used in the present instance was soamin (*para-amino-phenylarsonate*). The patient was tabetic. The author concludes that blindness was due to tabetic atrophy disastrously influenced by the treatment with soamin which he had received from a physician. He reviews the literature, but does not give exact references. Finally, he utters a caution regarding the possibility of ill effects from the Ehrlich "606," which will be in more or less indiscriminate use by every physician who can get it. He concludes: "In accepting and using this remedy, we must not forget that all of its predecessors were, for a time, considered harmless in their actions upon the visual apparatus, by authorities in whom we had every right to repose the greatest confidence."

ERNEST THOMSON.

(4) **Clarke**, of London, reports a couple of cases of optic atrophy following the administration of soamin and of orsudan respectively for the cure of syphilis, discusses the question of the arylarsonates generally, and gives a series of cautions with regard to the use of those drugs. Before these compounds are given internally, and at frequent intervals during their administration, the condition of the fundi should be noted, and the fields of vision be taken. Disease of the arteries, kidneys, and liver all contraindicate their employment, which should be carefully regulated, according to the weight and age of the patient. Indeed, Clarke thinks it doubtful whether they should ever be administered to patients over forty years of age.

Clarke's cases, in abstract, are as follows:

1.—Male, aged 46 years, noticed slight failure of sight after ten injections of soamin, each of five grains. Some four months later, five further injections of the same strength were given, and sight began to fail after the third. On examination, simple optic atrophy. Retinal arteries sometimes of normal calibre, and at other times "very markedly attenuated." R.V.=hand-movements (barely). L.V.=6/12 ptly. Left field of vision markedly contracted.

2.—Male, aged 49 years, received nine injections, each of ten grains of orsudan, and his sight began to fail after the last injection. On examination, "vision in both eyes very bad, but varies." Simple atrophy of each optic disc. The retinal vessels appeared to vary in size, although at all times the arteries were narrower than normal. Marked degenerative changes at both macule.

In the discussion that followed the reading of Clarke's communication, cases of disturbance of sight after the administration of arylarsonates and soamin were mentioned by **A. H. Payan Dawnay**, of London, and by **C. Wray**, also of London.

SYDNEY STEPHENSON.

XI.—OPERATIONS.

- (1) **Fergus, A. Freeland**.—Mr. Percival Pott and the treatment of lachrymal obstruction. *Ophthalmic Review*, April, 1909.
- (2) **Rockcliffe, W. C.**—A new danger arising from the use of plated instruments in ophthalmic operations. *Ophthalmic Review*, July, 1909.
- (3) **Taylor, S. Johnson**.—Operations on the globe in presence of chronic dacryocystitis. *Ophthalmic Review*, October, 1909.
- (4) **Harman, N. Bishop**.—Irrigation after cataract extraction. *Ophthalmic Review*, November, 1909.

- (5) Clark, Somerton.—Reclination of cataract. *Ophthalmic Review*, November, 1909.
- (6) Killen, Wm Marcus.—Intraocular injection and irrigation in the treatment of unripe cataract. *Ophthalmic Review*, December, 1909.
- (7) Elschmig, A.—On cyclodialysis. (Ueber die Zyklodialyse.) *Klin. Monatsbl. f. Augenheilkunde*, Beilageheft, 1910.
- (8) Bailliart, P.—Traitement du chalazion. *Bulletin Général de Thérapeutique*, 15 février, 1910.
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- (24) **Cosmettatos, G. F.**—On some difficulties in the technique of iridectomy. *La Clinique Ophtalmologique*, 10 juillet, 1910.
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- (26) **Kuhnt, Herman.**—On some improvements in keratoplasty. (Ueber einige Verbesserungen der Bindehaut Keratoplastik.) *Zeitschrift für Augenheilkunde*, Juli, 1910.
- (27) **Bettremieux.**—Simple sclerectomy in detachment of the retina. *La Clinique Ophtalmologique*, 10 août, 1910.
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(1) After pointing out that Pott was familiar with the modern methods of treatment of lacrymal obstruction and chronic dacryocystitis, and was in favour of syringing rather than of probing, **Fergus**, of Glasgow, states that his invariable treatment in this condition is to begin by passing fine Bowman's probes and by thoroughly irrigating with normal saline. He is opposed to slitting the canaliculus except in cases of ectropion, where the punctum is not in contact with the globe, a dilator being sufficient. In event of failure to cure, he resorts to removal of the sac: subsequent troublesome epiphora is unusual, but in one case the lacrymal gland had to be extirpated. If after removal of the sac discharge still continues, a portion of the sac has probably been left, or the disease is tuberculous and has invaded the tissues. He incises acute abscess, cures the cavity, and allows it to granulate.

A. H. PAYAN DAWNAY.

(2) **Rockcliffe**, of Hull, gives details of a case of cataract extraction, in which acute panophthalmitis set in on the day following operation. On the fourth day, during irrigation, a small, bright, foreign body was seen floating in the lotion; it was found to correspond with a defect in the plating on a pair of de Wecker's scissors, and measured 1.5 mm. by 1 mm. It is suggested that a fault in the plating, in the presence of a saline solution, would set up a battery action, and explain the separation of the plating, and also similarly the subsequent inflammation in the eye.

A. H. PAYAN DAWNAY.

(3) After observing the necessity of removing the sac, when diseased, before performing any intraocular operation, **Taylor**, of Norwich, suggests that in cases where two operations are undesirable from physical weakness, or impossible from lack of time, as in glaucoma, recourse should be had to occlusion of the canaliculi by ligature or by application of the cautery, followed by antiseptic irrigation of the conjunctival sac, immediately preceding the intraocular manipulation. He mentions three recent cases of successful cataract extraction by himself under such conditions.

A. H. PAYAN DAWNAY.

(4) **Harman**, of London, strongly advocates irrigation, and describes a simple form of apparatus which he has found useful. It consists of a 100 c.c.

Schuster's drop-bottle, with the snout shortened to enlarge the orifice, to which is attached by six inches of rubber tubing a nozzle of an Anel's syringe, with a slit-like opening. The whole is easily sterilized.

A. H. PAYAN DAWNAY.

(5) **Clark** records a case of a native who had extraction done in one eye, and a year later, couching in the other by a Hakim. Four years after the vision was equally good in both, 6/18 with + 10 D. The couched lens (the left) is easily seen below to the temporal side, and when the man looks to the right the lens closes the pupil; and on looking straight "the lens looks like a moon twenty-two days old."

A. H. PAYAN DAWNAY.

(6) This paper, by **Killen**, of Belfast, is a concise and interesting account of M'Keown's method. He first classifies cataract structurally, functionally, and surgically. The principle of the method is the conversion of an unripe into a ripe cataract at the time of operation, and the essentials are: (i) the use of absolutely sterile saline at about blood heat; (ii) not too high a pressure; (iii) avoidance of injury to the vitreous; (iv) the selection of suitable cases. Such are chiefly incomplete cortical cataracts after the age of nucleus formation, especially where a shallow anterior chamber shows cortical swelling, and some incomplete nuclear ones with troublesome cortex. Then follows a detailed description of the apparatus and method of procedure. The results are said to be as good in the hands of the experienced as those obtained by other methods, while secondary operations are fewer. Sometimes, a mild iritis occurs, but infection and suppuration are very rare. The most serious risk is injury to the vitreous: the visual result at first may be quite good under such circumstances, then diminution sets in from vitreous opacities, less frequently there may be choroidal degeneration, cloudy fundus, pale disc, or even signs of glaucoma.

A. H. PAYAN DAWNAY.

(7) In his introductory remarks **Elschnig** rejects the usual division into simple and inflammatory glaucoma, the extensive use of Schiötz's tonometer having led him to recognise the essential unity of the glaucomatous disease. He prefers to distinguish between compensated and uncompensated glaucoma, according to the absence or presence of so-called inflammatory signs and symptoms. Tonometry has, moreover, taught Elschnig to think very little of myotics as a substitute for operative treatment; after the latter, however, they show to greater advantage. Cyclodialysis was performed on 86 eyes; in some cases the operation was done three or four times on the same eye. It is a more painful procedure than iridectomy, and, although not always successful, produced in a very few instances only any ill effects. The clinical notes on the numerous cases are very interesting reading, but as the time of observation was in many cases rather short, Elschnig himself refrains from drawing final conclusions. But this he states, namely, that cyclodialysis is a very valuable addition to the operations for glaucoma, deserving an appreciative regard and further trial.

C. MARKUS.

(8) **P. Bailliart**, of Paris, considers repeated massage with ordinary or boracic vaseline may cause gradual emptying of the contents of very small cysts. Soft cysts with liquid contents need puncture and curettage. Bailliart prefers Dehenné's forceps to those of Desmarres. The former are smaller, more simple and handy, they have no screw, simple pressure separates their blades which come together when this is relaxed, and the pain caused by the screwing-up of the Desmarres forceps is avoided by their use. He advises a large and deep incision, and after curetting, no cauterisation with silver nitrate or tincture of iodine is necessary.

In those cases where the masses in the cyst are hard and resist the curette, dissection by forceps and fine-pointed scissors, followed by the application into

the pouch of a fine galvano- or thermo-cautery point is necessary. If the chalazion projects and is more or less pediculated, as old chalazions often are, the sac should be emptied and the projecting portion of mucous membrane excised. Extirpation, the more radical and difficult operation, is only really necessary for large and hard chalazions, and for those which have already relapsed. Cocaine solution, 1 per cent., must be injected above and around the tumour, and the ball of œdema produced by this injection must not be mistaken for the cyst itself.

The operations must be done with the patient in a recumbent position to avoid fainting.

H. HAWARD BYWATER.

(9) **Wootton** has operated upon 37 cases, using Heisrath's and Kuhnt's methods. All the cases were severe. The results were so satisfactory that he wishes to recommend the procedures to other surgeons. The combined excision, which includes the upper fold and a strip of the tarsal cartilage, is indicated in the severe trachoma of adults, in all stages except the cicatricial, while resection of the tarsus is specially adapted for the cicatricial stage, this latter method thus anticipating the natural cure of the disease, and at the same time relieving the patient of any fear of troubles due to a distorted tarsus. With Heisrath's method, movement of the lids and eyeballs are not limited, ptosis is cured, and pannus disappears.

ROSA FORD.

(10) **Cazalis**, of Béziers, after mentioning that the so-frequent relapse after operation for pterygium is often more serious than the original lesion, and citing two instances of this, describes an operative method having one special feature, *viz.*, the formation of a conjunctival hem opposite the cornea, which he considers a positive safeguard against relapse.

The pterygium is carefully detached from the cornea and from its scleral bed of implantation. It is excised at its base, but not too close to this, so as to avoid the loss of useful conjunctival tissue. The fleshy portion thus left subsequently disappears.

Following Deschamps of Grenoble (*L'Ophthalmologie Provinciale*, December, 1909), he then vigorously cures both the corneal and scleral surfaces. He also uses the cautery and a very effective scarifier, which he passes like a plane over the two surfaces of implantation.

To fill up the gap a quadrilateral flap is formed from the conjunctiva above, thus, a snip of the curved scissors divides the conjunctiva close to the sclero-corneal limbus. The sub-conjunctival attachments are then freed (as in finding a rectus muscle) and a second scissor snip is made from the base of the pterygium, obliquely parallel to the first cut. The mobile flap thus formed may be easily brought down to join the lower level of healthy conjunctiva. The extreme end of the upper conjunctival flap is now seized on the corneal side and rolled inwards just sufficiently. It is then quilted with a threaded needle, which passes through the hem thus formed two or three times and then proceeds to the opposite angle of the lower conjunctival flap. A few sutures are then placed in the continuation of the opposing surfaces.

Cazalis considers that to prevent relapse, the line of suture must be brought as low as possible. It must not in any case be at the level of the horizontal axis of the globe. It must be placed well below the bed of the pterygium. We should have opposite the cornea not a raw line but an epithelial lining of normal conjunctiva.

H. HAWARD BYWATER.

(11) Lymphatic cysts of the conjunctiva are benign and are generally left alone when small or excised when large. **Galezowski's** method of treatment applies to the former, which, however small, are apt to distress some patients—generally female—and in whom excision would leave a mark as objectionable as the cyst. He holds the anæsthetized conjunctiva between

the thumb and index of the left hand, and seizes and crushes the cyst with a pair of epilative forceps. A small ecchymosis results, but no bandage is required, and there is no tendency for the cyst to return.

J. JAMESON EVANS.

(12) **Marx** reports upon experiments on rabbits, in which he eviscerated and filled the scleral cavity with fatty tissue, and subsequently made histological examinations of the resulting stump. He found that at end of 10-14 days new vessels are sent into the fatty tissue and young connective fibres are formed in it, especially in the septa. The fat cells disappeared, but fat and necrotic tissue remained for a long time in the cavity. The author also reports upon implantation of fatty tissue in human subjects. He filled the cavity as tightly as possible. A good prothesis was obtained, but nothing can be said as yet as to its permanency, the longest case being only nine months old.

PERCIVAL J. HAY.

(13) **Schmidt** (Wilhelmshaven).—This paper gives the results obtained by the author's modifications of Mules' operation in six cases. The method employed has already been described in the *Zeitschrift*, Bd. XVI, *Erganzungshft* S. 63, and Bd. XVIII, S. 157, and Bd. XXI, S. 16. Schmidt has his balls turned from a block cut from the femur-heads of oxen. These are slowly calcined over a Bunsen burner, and are used instead of the gold or glass balls more usually employed. The author finds that these balls are better tolerated by the tissues, and being of animal substance, are not so liable to be extruded.

The latter half of the paper attempts to explain away the large number of cases of sympathetic ophthalmia which have followed Mules' operation. He cites 22 cases in which this unfortunate result has been recorded.

T. HARRISON BUTLER.

Barraquer was the first to perform this operation but as his work was published in Spanish, it obtained little notice until Bartels introduced the method into Germany. **Lauber**, of Vienna, has filled Tenon's capsule with fat upon 37 occasions, and is very satisfied with the results he has obtained. He operates in the following way.—The eye is removed in the usual manner, but before the recti muscles are divided, a double armed suture is passed through them. A suitable piece of fat is obtained by making an L-shaped incision in the abdominal parietes of the patient. The fat is placed in Tenon's capsule, and the recti are sewn together over it. Tenon's capsule is sutured with catgut; the conjunctiva, with silk. The result is a moveable stump for the artificial eye. Lauber has had only four failures.

T. HARRISON BUTLER.

(15) **Toti** gives a detailed account of his operation of dacryocystorhinostomy for the treatment of suppurative conditions of the lacrymal sac, which has already been described in *THE OPHTHALMOSCOPE* (Vol. III, p. 463.) The article should be read in the original by those who wish to perform the operation.

R. J. COULTER.

(16) In this procedure **Bufill** makes a long bridge-flap of the lash-bearing zone by means of two incisions, the first in the grey line and the second above the roots of the lashes. A third incision isolates an area of skin above the bridge-flap: this area is excised with the subjacent tissues down to the tarsus, and placed on one side. The lash-bearing flap is stitched up to the upper edge of the tarsal plate and to the skin above the excised area, and, finally, the excised skin, freed from all subcutaneous fat, is fixed in the gap at the lid margin. This operation, as Bufill says, is the descendant of that known as Gayet's (or Spencer Watson's) and is extremely like the "Button and Button-hole" method devised by the last-named surgeon. It has the defect common

to all these, namely, that the new lid margin is made of skin and not of mucous membrane.

HAROLD GRIMSDALE.

(17) **Kalt**, of Paris, has performed the operation for simple extraction of cataract with suture, described by him in 1894, 2,500 times and claims that he has had prolapse of the iris in 3 per cent. only of his last 1,100 cases, and that even when it has occurred, it has been small and easily excised without any risk of loss of vitreous; and the pillars of the coloboma have been replaced without any difficulty, leaving as good a result as if a combined operation had been performed. He further claims that if loss of vitreous occurs during the operation, it can easily be controlled by means of the suture. The steps of the operation are as follows.—A very fine needle, armed with a correspondingly fine cotton thread, is entered from the highest part of the corneal margin, passed through half the thickness of the cornea for a distance of 1 mm. and brought out as near the limbus as possible. The needle is then passed horizontally through the episcleral tissue and the loop of thread between the two insertions of the suture, which should be 0.5 mm. apart, is left long and turned towards the outer canthus. The ends of the thread are then carefully placed, the upper on the forehead and the lower on the cheek and the incision is made passing between the two insertions of the thread; the lens is extracted and the iris is replaced by traction on the thread, assisted, if necessary, by the spatula; the wound is closed by pulling on the upper thread and the suture is tied. Finally, any soft *débris* is removed by suction. The suture is removed on the third day if the pupil dilates well, but if there is any evidence of the presence of infective organisms in the conjunctival sac, it is taken out earlier. Kalt claims that his suture does not cause any increase in post-operative astigmatism.

R. J. COULTER.

(18) Büdinger's method was adopted by **Meisner** in a case of cancrroid of the lower lid in a woman, aged 72 years. The lid was removed from the outer canthus to the lacrymal punctum; a flap somewhat larger than the defect was taken from the ear by cutting through its whole thickness, and stitched to the conjunctiva and skin. The defect in the ear was closed with sutures. Healing took place *per primam*. Seven weeks later, a small nodule appeared at the punctum, necessitating the removal of the remaining part of the lid. The piece excised in this second operation included a bit of the newly transplanted cartilage. Part of the latter, particularly well supplied with perichondrium was found, on microscopic examination, to be practically unchanged. In other parts, however, the cartilage lacunæ were mostly empty, and there was beginning invasion of the matrix by connective tissue.

C. MARKUS.

(19) **Claiborne**, of New York, relates a number of accidents, some of them amusing, but most of them unfortunate or even tragic, that have fallen to his lot in operating upon the eye. They include ether explosions, eyes lost through injury after extraction of cataract (an accident of which the author seems to have had more than his share), delayed healing of cataract incision, loss of eyes by infection after cataract extraction, and post-operative choroidal hæmorrhage. In many of the cases the moral is obvious; in others nothing but bad luck would seem to account for the disastrous results. Among other conclusions Claiborne holds that very old people after cataract operation should be under the care of a special nurse for forty-eight hours, and that many of the recorded accidents might have been avoided if general anæsthesia had been employed.

A. J. BALLANTYNE.

(20) **Denig** adds yet another to the many procedures recommended for the establishment of a filtering cicatrix, in cases which do not yield to iridectomy. A long narrow conjunctival flap is formed above (3 mm. wide and 2 or more c.m. long, *i.e.*, reaching from equator to limbus), a section is made like that

employed for iridectomy, and then with a Graefe knife a perforation is made in the cornea, about $3\frac{1}{2}$ mm. long and 2 mm. from the edge. The free end of the conjunctival flap is passed into the anterior chamber by the superior section, then out through the perforation in the cornea. This forms a loop through which the end of the flap is pulled so as to make a knot. The end of the flap is buried subconjunctivally.

The author describes variants on the above which he has performed, and others which he proposes to try when opportunity offers. The results obtained so far in a small number of cases do not appear to be specially encouraging, but the operation seems to be without risk. Besides chronic simple glaucoma and absolute glaucoma, the author thinks the operation may be found useful in cases of corneal staphyloma, keratoconus, etc.

A. J. BALLANTYNE.

(21) This is an illustrated description of two instruments which **Wanless**, of Miraj, has found of use, in that in his hands they have made Smith's operation easier, and have reduced the number of vitreous losses. One is a lid elevator to replace the blunt hook used by Smith. It is described as modified from a forked elevator or double strabismus hook. The ends of the fork are not free, but united by a cross-bar. Compared with the single hook, it is less likely to slip, gives a wider exposure, and causes less pain. The other instrument is a ring-shaped expressor or extractor, which serves, not only to expel the lens, but also to receive it and to carry it away. **Wanless** performs Smith's operation in about 90 per cent. of his extractions, and is satisfied that "the results on discharge from hospital are quite as good as and probably 5 per cent. better than formerly." There has been less post-operative trouble, and the patients have been able to leave hospital, on an average, two days earlier than with the ordinary operation.

H. HERBERT.

(22) This is a paper on trephining for glaucoma, as introduced by Freeland Fergus and Elliot, prefaced by a brief historical note. **Maynard**, of Calcutta, has performed the operation "a considerable number of times" with uniform success, and regards it as the ideal operation for subacute and chronic glaucoma. He uses a small von Hippel's corneal trephine (made by Weiss), worked by clockwork and "stopped," so as to cut no deeper than half a millimetre. He finds that it cuts more cleanly and quickly than Bowman's instrument worked by the fingers, and that it does not get blunt as soon as Fergus's serrated trephine. If the circle of tissue is not completely severed by the trephine, it is cut away by scissors. The iris bulging into the opening is divided in a radial direction with scissors, and this usually suffices to reduce the bulging and to restore the normal shape of the pupil. Otherwise, an iridectomy is performed. Should no aqueous have escaped up to this point, a flat iris repositor is passed into the anterior chamber, thus performing a cyclodialysis, as is done by Fergus. The only accident which has happened has been in two cases buttonholing the conjunctival flap in such a manner as to expose the sclero-corneal trephine opening. No harm resulted. There is no statement of the number of cases treated or of the length of time they were under observation.

H. HERBERT.

(23) This paper is a reply to the account published two months earlier by Major Kilkelly,* of the results of cataract operations performed by **Lieut.-Col. Smith**, in Bombay. Smith writes:—"As regards the operations, they were nicely done, and I have no doubt that if they had been under my staff they would have done just as well as the cases published herewith which represent my ordinary routine experience. What happened to those cases after they

* For abstract see THE OPHTHALMOSCOPE, September, 1910, p. 672.

left the operating table I do not know. Suffice it to say that the results are so extravagantly bad in every detail that they are not intelligible to me."

He appeals to his Jullundur results, which have been freely inspected by many visitors from India, America, and elsewhere, and gives the visual results of a small series of thirteen intracapsular operations performed since the publication of Kilkelly's article.

The reply is, and was bound to be, unsatisfying. Considering that in Smith's work the after-treatment is practically *nil* in most cases, the bandages remaining untouched for some days, his cases should obviously have done as well in Bombay as at Jullundur.

H. HERBERT.

(24) The article by **Cosmettatos**, of Athens, concerns the use of Tyrrel's hook in the performance of certain iridectomies, namely, those in which there are multiple posterior synechiae, (1) with or (2) without abolition of the anterior chamber. The method of using the hook in the first class presents nothing new. In the second class the author first opens the anterior chamber at the corneal periphery with a cataract knife, withdraws this and then inserts by the same opening another knife with a curved cutting edge. This is slid along between the iris and the angle with the edge towards the angle, and is made to cut the cornea from within outwards parallel to the sclero-corneal border. The iridectomy is then performed by the aid of the hook.

ERNEST THOMSON.

(25) Still another variation of the operation of sclerectomy! **Jacqueau**, of Lyons, finding that Lagrange's operation is somewhat difficult of exact performance, has modified the method in the following way.—Having made a corneal incision terminating in the sclerotic and provided with a conjunctival flap (made, presumably, with the cataract knife), he first reflects the conjunctival flap and does an ordinary iridectomy. Then a pair of scissors, straight or slightly curved, blunt-pointed, thin yet strong, is employed, by sliding one branch under the sclera for about two millimetres, to make a clean section of the sclera obliquely upwards and inwards. Next, the internal lip of the scleral incision is grasped with fine toothed forceps, and by a second cut of the scissors, *on the flat*, a slice of the sclera is removed. One thus gets a perfectly regular little loss of substance of V-shape, and of exactly the size required. The conjunctiva is replaced and smoothed out; the operation is finished. The author proceeds to explain that it is not advisable to make the second incision in the same way as the first. The cut is much more awkward to make from the nasal side, and it is not necessary thus to introduce the scissors a second time under the sclera. Adrenalin should be instilled prior to operation. The article is illustrated with two figures indicating the making of the two incisions; from these one gathers that the scissors used for the first cut are slightly curved on the flat, those for the second cut being curved on the edge. Such difference is not mentioned in the text.

ERNEST THOMSON.

(26) **Kuhnt**, of Bonn, thinks that keratoplastic operations, covering defects of the cornea with flaps of conjunctiva, are much neglected by the profession. He constantly employs conjunctival flaps to cover large corneal ulcers in order to shut in fistulae and to repair perforations, and finds that the procedure is most effectual.

To obtain adhesion of the flap, it is essential that an ulcer be scraped clean of pus and septic detritus. This cannot be thoroughly done when the cornea is perforated, or when an ulcer has penetrated to Descemet's membrane, for there would be very great danger of wounding the iris or even the lens. To avoid this catastrophe, Kuhnt makes a peripheral section with a Graefe's knife, and introduces a broad spatula to act as a background upon which to scrape the

ulcer. If there be no anterior chamber, it may be necessary to stretch that part of the eye which it is designed to incise between two forceps, one held by the assistant. Having scraped the ulcer, a flap of conjunctiva of sufficient breadth is cut from outside, half the circumference of the cornea, and brought across the cornea, so that it lies vertically across its centre, assuming the ulcer to be centrally situated. The slack is taken up at the top by two sutures. Later on, the two attachments of the graft above and below can be cut away with scissors.

The second portion of the paper describes a method of excising a prolapse, covering the orifice left with a corneal flap, made of half the thickness of the neighbouring cornea, and, finally, placing a conjunctival flap over it to seal it up finally. This method is difficult to follow, even with the aid of a diagram. It would be very interesting to see Kuhnt perform this little operation.

The author frequently refers to his monograph upon the uses of the conjunctiva, which is obviously a work which should be mastered by surgeons practising in industrial towns where accidents to the eye are prevalent.

T. HARRISON BUTLER.

(27) **Bettremieux**, of Roubaix, holds that simple sclerectomy, often useful in glaucoma, is curative in some cases of retinal detachment. He deprecates the scepticism of Lagrange and others, who doubt that an operation which aims at lowering the tension in the one disease should be of value in the other where the tension is already too low. In reality, says Bettremieux, it is only in old detachments that the tension is lowered. In spontaneous recent detachment it is usually normal and may even, at the commencement, be raised. It is at this early period that we have the best chance for treatment. He believes that simple sclerectomy cures a certain number of detachments by encouraging the excretion of the aqueous accumulated in great quantity and at high pressure in the anterior chamber. That an abundant flow of liquid under pressure may take place on opening the anterior chamber for detachment of the retina has been noted by Dransart and Bettremieux himself. Coppez has spoken of a very abundant flow of serous fluid when performing iridectomy for detachment. According to Nicati, certain detachments are due to hypersecretion of the aqueous "insinuating itself between the rods and the epithelium of the retina" through a leakage in the canal of Petit. Boucheron has come to the conclusion that the object of an operation for detachment should be to produce persistent lowered tension in the anterior chamber, so as to induce dialysis of the retinal exudate through the delicate membranes of the extra-choroidal space.

Now, simple sclerectomy facilitates the exit of venous blood in the region of Schlemm's canal, lowers the tension of the capillaries in the whole anterior region of the uveal tract, and, as a corollary, it should involve that lowering of the tension of the aqueous which appears to be the hydrostatic condition of the eye which is most favourable to the cure of a certain number of detachments.

The author then records nine cases, in greater or less detail, on which his operation of simple sclerectomy was performed. He records one failure, two improvements, and six cures or very great improvements. The reviewer will take the liberty of synopsising these cases.

Case I.—Non-myope; perimacular detachment, cause unknown. Cure, V.A. = I.

Case II.—Refraction not stated; small localized detachment above the disc. Cure, but V.A. not stated.

Case III.—Traumatic detachment in a child aged 8 years. Sclerectomy performed three times. Cure, V.A. not stated.

The foregoing three cases have remained well for more than two years.

Case IV.—Myope of high degree. Improvement. Case lost sight of.

Case V.—No improvement.

Case VI.—Hypermetropia. Cause of detachment—? traumatic. Re-attachment of retina with metamorphopsia. Iritis. V.A. = time on watch.

Case VII.—Refraction not stated. Small peripapillary detachment. Re-attachment, disappearance of scotoma. "Marked amelioration" of the V.A.

Case VIII.—Refraction not stated. Details of detachment not stated. V.A., less than $\frac{1}{100}$ before operation, went up to $\frac{1}{2}$ after operation. Re-attachment imperfect.

Case IX.—High myopia. Inferior detachment of half the retina. V.A. had lately been worse than usual. After sclerectomy V.A. returned "to its usual state."

In performing the operation, Bettremieux dissects up the conjunctiva round the cornea for a distance of 12 to 15 millimetres, and bares the sclerotic. Then, with special toothed forceps, he picks up successive flakes of the sclera and shaves them off with a thin Graefe knife. In this way he makes a trench or furrow in the sclera, 10-12 mm. long and about 2 mm. wide, along the limbus. The conjunctiva is then well freed all round and united by two lateral stitches over the site of operation. ERNEST THOMSON.

(28) **Lagleyze**, of Buenos Ayres, shows that the only method of restoring full mobility in squint is to advance one muscle, at the same time as we set the opponent back. For advancement, he employs a method of folding without division, similar to that known as Williams' operation, but differing from it, in that Lagleyze removes a small part of the conjunctiva and capsule over the tendon. Lagleyze claims priority for his method, but Williams' operation, which is in many respects similar, was described in 1887, five years before the publication of Lagleyze, and although originally the operation of Williams included division of the muscle, it was performed, to my knowledge, without that division in the early nineties. Whether it was described as a separate operation, I cannot say. HAROLD GRIMSDALE.

XII.—TRACHOMA.

- (1) **Barrett, James W. and Orr, W. F.**—The distribution of trachoma in the State of Victoria. *Intercolonial Medical Journal of Australasia*, September 20th, 1909.
- (2) **Ruata, Vittorio.**—On trachoma of the lacrymal canaliculi. (Sul tracoma dei canalicoli lacarimali.) *Archivio di Ottalmologia*, June, 1910.
- (3) **Meyerhof.**—Researches on the ætiology of trachoma. *Revue Générale d'Ophthalmologie*, 31 juillet, 1910.
- (4) **Lindner, K.**—The free initial-forms of Prowazek's enclosures. (Die freie Initialform der Prowazek'schen Einschlüsse.) von Graefe's *Archiv f. Ophthalmologie*, Bd. LXXVI, 30 August, 1910.
- (5) **Fritsch, H., Hofstätter, A., and Lindner, K.**—Experimental researches upon trachoma. (Experimentelle Studien zur Trachomfrage.) von Graefe's *Archiv f. Ophthalmologie*, Bd. LXXVI, 30 August, 1910.

(1) **Barrett and Orr** have tabulated the district of origin of 100 cases of trachoma seen at the Eye and Ear Hospital, Melbourne, with the view of determining the validity of the belief that the disease is most common in the dry, hot, dusty districts. They state that their statistics, looked at broadly,

indicate that heat, dryness, and dust, are the fundamental underlying factors in the distribution of the disease.

ERNEST THOMSON.

(2) **Ruata** describes fully a case from the clinic of Lodato in which the canaliculi became affected after long-standing trachoma of the conjunctiva. There was great thickening of the mucous membrane and dilatation of the canal, with muco-purulent discharge. The lower canal was affected first, and the upper about two months later and after the first had been treated. The treatment consisted in opening freely and flushing out the canals.

Pieces of the thickened membrane were examined and showed the structure of typical trachoma, and smears of the tissue showed the "trachoma bodies" of Prowazek.

LESLIE BUCHANAN.

(3) In a brief communication, **Meyerhof**, of Cairo, confirms the finding of Prowazek bodies in trachoma, and also the assertions that they are not found in the submucosa, and that they disappear rapidly under treatment with copper sulphate. On the other hand, he hesitates to admit that these bodies are the actual infective agents, but expresses the hope that their constant presence in the epithelial cells of recent granulations will allow us to utilise them as a new means of diagnosis.

Then follow two detached observations, standing by themselves without any remarks by the author.—(1) A workman was burned about the eyes with molten lead. In one eye a follicular conjunctivitis occurred, and the trachoma bodies were found; this conjunctivitis developed a typical trachomatous character, and was still present four months later. (2) A lady and gentleman consulted Meyerhof. Both had a recent follicular conjunctivitis. In the man "an epithelial keratitis with corneal infiltrates near the upper limbus, such as often precede the development of pannus," appeared later on. No trachoma bodies were found. In the woman, on the other hand, in whom the cornea remained unaffected, the bodies were obtained. Finally, in the man's case the follicles and keratitis disappeared after a month of simple treatment; while in the case of the woman a severe trachoma occurred, and the fellow eye became involved.

The author concludes that definite statements cannot yet be made, and trusts that further research will fill up the gaps in our knowledge.

ERNEST THOMSON.

(4) Prowazek's corpuscles are found at a time when the acute stage of trachoma has subsided, and they disappear a long time before recovery has taken place. This is the principal reason why they have so long escaped detection.

To understand their nature, it is necessary to distinguish between their appearance in the discharge (smear specimens) and in sections of the tissue. In the former case we see at the earliest stage a small hazy blue spot (with Giemsa's stain) within the epithelial cell and separated from the nucleus. Later on, we find more of these spots grouped into small heaps, which gradually approach and enclose the nucleus. At this stage red, distinctive, and very small globules appear within the blue heap; they rapidly increase and gradually almost replace the blue masses. The first idea was to consider the red globules (which are generally called the "elementary bodies") as the only living parasites and the blue part as a cell-exudation due to a reaction against the invasion. Based upon the examination of sections, **Lindner** contraverts this theory. He finds that the blue substance consists itself of small corpuscles, which he terms "initial-bodies." They are round, elliptical, biscuit- or sickle-shaped, the difference of appearance being due to varying stages of their propagation, which is different from that in cocci; but they are otherwise somewhat similar to gonococci, with which they may have often been formerly confounded, and

are Gram-negative. How the "elementary-bodies" develop out of the "initial-bodies" is not yet quite understood. Halberstadter and Prowazek have since accepted Lindner's description of the "initial-bodies" and have further described another kind of enclosure, the "residual-bodies." These are larger formations stained by Giemsa ; but Lindner thinks that they are only detached fragments of nuclei.

R. GRUBER.

(5) In some cases of blennorrhœa neonatorum we find no gonococci in the discharge, but instead the cellular enclosures of Prowazek, which are now generally considered as pathognomonic of trachoma. Sometimes, both gonococci and corpuscles are present. This fact is considered by some as tending to disprove the specific nature of Prowazek's corpuscles. But the authors show that by inoculation of the eye of monkeys—preferably baboons—with the discharge of non-gonococcic blennorrhœa neonatorum a conjunctivitis is produced which is clinically and anatomically identical with trachoma, although it does not lead to the formation of scar-tissue. The final confirmation of this conclusion has been established by Wolfrum, who produced trachoma in the conjunctiva of an adult by introducing a particle of discharge from the conjunctiva of the new-born.

R. GRUBER.

XIII.—ÆTIOLOGY OF IRITIS.

- (1) Ramsay, Maitland.—Inflammation of the iris. *Hospital*, Oct. 8th, 1910.
- (2) Dunn, Percy.—Ætiology of iritis. *British Medical Journal*, November 12th, 1910.
- (3) Lowe, T. Pagan.—Ætiology of iritis. *British Medical Journal*, November 19th, 1910.
- (4) Beaumont, W. M.—The Ætiology of iritis. *British Medical Journal*, December 17th, 1910.

(1) Four cases of iritis are described in this clinical lecture by Ramsay, of Glasgow. The first complicated a diplo-bacillary conjunctivitis, and was associated with intestinal stasis. The second was a recurrent rheumatic case in a patient who had had acute rheumatic fever. It was rapidly relieved by salicylates. The third case was a most interesting example of tuberculous iritis, with nodes in the iridic angle. The ætiology was proved by a local reaction to an injection of old tuberculin, after the failure of Moro's ointment to provoke a reaction. Tuberculin was being used regularly, but the author does not state the variety employed in this course of treatment. In addition, perchlorides of iron and mercury were exhibited. The last case was syphilitic. The woman had had several miscarriages, and the Wassermann reaction was obtained. The aqueous was drawn off, but the *spirochæta pallida* was not demonstrated in it. This case was treated with calomel and opium, pushed till signs of salivation appeared.

T. HARRISON BUTLER.

(2) Dunn, in a letter to the Editor of the *British Medical Journal*, which appears to bear reference to the communications of Jennings, Campbell, Worth, and Butler, which have been abstracted in THE OPHTHALMOSCOPE for September, 1910, p. 668, and to the letter of "Anchises" in the *British*

Medical Journal for October 15th, 1910, gives it as his opinion that the proportion of syphilitic iritis seen by any one surgeon depends upon the environment, the habits, and the diathesis of the patients among whom he has to work. According to Dunn's own observation during twenty-five years or so, a change has come over the statistics, which he believes to be due to a modified virulence of the syphilitic virus, to improved methods of treatment of the primary infection, and to a diminished frequency of incidence of the disease. This change is represented by the fact that a quarter of a century ago "it was not only common to see syphilitic iritis of one eye among hospital patients, but it was not uncommon to find the disease present in both eyes. Nowadays, however, again according to my observation, it is comparatively rare to meet with monocular syphilitic iritis, while double syphilitic iritis is practically a pathological curiosity." Further, according to Dunn, "the cases of so-called rheumatic iritis—those in which a history of a previous gonorrhœa can be obtained in men, and in which syphilis as a cause can be absolutely excluded—are undoubtedly common, so common as to form by far the largest series of cases of iritis." ERNEST THOMSON.

(3) **Lowe**, of Bath, commenting upon Dunn's letter in the *British Medical Journal* of November 12th, 1910, says that in spa practice most cases of iritis sent for treatment are labelled "rheumatic." According to the writer's experience, these cases are due, with few exceptions, to oral sepsis or to gonorrhœa in the proportion of 4 of the former to 1 of the latter. He calls attention to the connection, which he believes to be very common, between recurrent iritis and suppurating teeth. ERNEST THOMSON.

(4) **Beaumont**, of Bath, in this article reiterates the belief, expressed originally in the *British Medical Journal* for July 16th, 1910, that rheumatic iritis, notwithstanding statements to the contrary by other authors (notably Jennings of Philadelphia), is extremely rare. The divergence of opinion, he thinks, is due to a difference of diagnosis rather than to a difference of incidence of the disease. Critical enquiry will, in many cases, show that the rheumatism which produces rheumatic iritis is not true rheumatism, but a gonococcal or other toxæmic infection. It has been too much the custom to classify all cases of iritis that are not obviously specific or gonorrhœal or traumatic, or occurring in gouty patients, as "rheumatic," including amongst them a number of cases due to various forms of toxæmic absorption. All the same the author holds that true rheumatism as a possible, though rare, cause of iritis cannot be excluded. He refers to a clinical case by Forster, of Lowestoft (*British Medical Journal*, 1903), in which iritis occurred during the acute stage of rheumatism. "Here the sequence of events is so marked, so obvious, that to argue that we are not dealing with cause and effect would appear to require the strategy of a dialectician. Strategy has no place in a scientific discussion, and we must allow that if such cases as this were frequent, there would be nothing more to be said."

Turning to the bacteriological aspects of the question, Poynton and Paine have reported, (*Transactions Ophthalmological Society*, Vol. XXIII, p. 39), that iritis symptoms ensued in rabbits after the intravenous injection of cocci, in one case from ordinary rheumatic fever in a child, and in another from malignant endocarditis of rheumatic origin. Beaumont considers that the evidence furnished by these authors hardly proves that the endocarditis was undoubtedly due to the *diplococcus rheumaticus*. "Bearing in mind the multiplicity of organisms capable of producing malignant endocarditis, and the fact that the ordinary pyogenic organisms are responsible for the greater number of cases, it seems desirable that further investigations as to the identities of the micro-organisms should be

made. . . . It is desirable that full details of all cases of iritis occurring during the acute stage of rheumatic fever should be recorded."

Beaumont's article is clearly argued and deserves careful attention from ophthalmologists.

ERNEST THOMSON.

XIV.—NYSTAGMUS.

- (1) **Jackson, Ed.**—The recognition and measurement of low degrees of nystagmus. *Ophthal. Review*, January, 1910.
- (2) **Weekers, L.**—Employment nystagmus and neurosis. *La Clinique Ophthalmologique*, novembre 10, 1910.
- (3) **Elworthy, H. S.**—Miner's nystagmus. *British Medical Journal*, November 19th, 1910.

(1) The object of this paper by **Jackson**, of Denver, is best given in the following extract:—"The method of observing nystagmus here described consists in noting the character of the movements executed by definite structures in the ocular fundus as seen in the erect ophthalmoscopic image. Withdrawing the observer's eye until the optic disc appears to occupy the whole of the pupil one observes the apparent extent of the movements, whether a given vessel appears to pass entirely across the width of the pupil with each excursion of the eyeball, or only one-half or one-fourth of the distance. From this, by brief calculations, or from the tables given, the real extent of lateral or vertical movement is to be deduced."

A. H. PAVAN DAWNAY.

(2) In this article, **Weekers**, of Liège, argues in favour of the view that in miner's nystagmus the neuropathic ocular symptoms, which sometimes appear, are grafted on to the nystagmus, and considers as erroneous the view of Rutten and others that the nystagmus is a symptom of neurosis. He says that the latter thesis is contradicted by the known facts of miner's nystagmus. In the majority of nystagmic miners there is no trace of neurosis or of nervous defect. The manifestations of such a neurosis in this kind of nystagmus must no more be looked upon as symptoms than must the neuroses complicating a fractured thigh be regarded as a symptom thereof.

ERNEST THOMSON.

The article by **Elworthy**, who is not an ophthalmologist—he is an inspector of injured workmen to the Ebbw Vale Company—is worthy of close attention by those interested in the discussions between specialists as to the ætiology of this affection. Elworthy takes the matter up under the following headings, *viz.*: ætiology, pathology, symptoms and course, varieties, diagnosis, prognosis, relapses, and treatment, preventive and medical. The following is a *résumé* of the author's principal points:

Nystagmus occurs only in coal mines. It is due to fatigue of the eye, resulting from working by artificial light, with a black background and nearly black surrounding. The majority of workers prefer day work, and, consequently, get the minimum of daylight throughout the year.

An important fact pointed out by the author is that, in this colliery, the great majority of the miners work in the upright position. He offers no opinion as to the lying down position as a cause of nystagmus, but points out that nystagmus is observed in other underground workers, namely, in haulers, timbermen, and repairers, but not in ostlers who work in whitewashed stables. That nystagmus is not due to imperfect fusion is shown by its occurrence in one-eyed men

Nystagmus seldom appears until the miner has been working for some years. The first stage may be called latent nystagmus, the patient being unconscious that there is anything wrong, although nystagmic movements are obvious and definite. As long as the disease remains in the latent stage unperceived by the patient, it does not seem to interfere with his work. There is, in many cases, a general and increasing nervous irritability, and then a blow or a sudden fright is sufficient to break down the co-ordination of the ocular muscles, and the power of accommodation to see with moving eyes is lost. The man then discovers that he has nystagmus. In some, it is the lamps that seem to move or become blurred. In others, there is headache or pain in the eyes, or everything becomes misty and the man seems lost in a fog. Bending down or sudden movements increase the trouble; so does fright. A man may be able to walk about the streets well enough, but, if a dog barks or if someone shouts at him, he is immediately lost in a fog, and staggers about, quite unable to see what is coming or where he is going.

The most constant symptoms are headache, giddiness, and movements. One variety of nystagmus often passes into another. Nictitation often comes on late, but in some cases it is present early. The two eyes may be unequally affected, or have different movements, one lateral, the other vertical or rotatory, but the author has never seen two eyes rotating in opposite directions. The greatest discomfort and pain in the head is caused by the very fine and quick movements, and the least by the slower rotatory movements.

Our author classifies the varieties as follows:—lateral, vertical, rotatory, mixed, oblique, axial rotation, nictitation. The last, clonic spasm of the orbicularis, is generally associated with some other movement, but is sometimes present alone.

Diagnosis, while generally easy, is not always so. When headache or blurred lights are complained of, glaucoma must be excluded; and there are other causes of nystagmus than coal-mining.

An analysis of one hundred unselected cases brought out the following facts:—

Average age at commencement of disease	...	...	35½ years.
„ number of years underground	...	...	21¼ „
„ period between first noticing eyes and leaving work	...	...	8 months.
„ period of disability (an under-estimate)	...	...	5 „
Longest period of disability (patient not yet recovered)	...	...	28 „
Shortest period of disability (patient not yet recovered)	...	...	3 weeks.
Varieties of cases:—			
Rotatory	...	...	27 cases.
Lateral	...	...	25 „
Indefinite (including nictitation occurring alone)	...	...	18 „
Vertical	...	...	12 „
Mixed	...	...	12 „
Not recorded	...	...	5 „
Axial rotation	...	...	1 „
Oblique	...	...	0 „

The author brings out some interesting points in the matter of prognosis. The men who remain at work struggling against the disease take the longest to recover, especially if old. The sooner a man with nystagmus leaves off work, the better the prognosis. Some inference as to the duration may be drawn from the variety of the nystagmus :—

One case of axial rotation recovered in	...	...	6 weeks
18 indefinite cases recovered in an average of	...	...	3 months
27 rotatory cases recovered in	...	...	4½ "
14 cases associated with nictitation recovered in	...	...	5 "
25 lateral cases recovered in	...	...	5½ "
11 vertical " " " " " " " "	...	...	6 "
12 mixed " " " " " " " "	...	...	8 "

It thus appears that the mixed cases—that is, the cases with the greatest inco-ordination—take the longest time to recover. The rotatory and indefinite take the least. Fewer recover in winter than in summer. In summer they get more daylight.

The author has not yet had time, since he began the work, to come to conclusions as to the frequency of relapse. The variety of nystagmus in a relapse is not always the same as in the first attack.

With regard to treatment, we have to consider preventive measures as well as medical treatment. "The importance of daylight seems to have been overlooked both by the miner and the employer. I take the view that, as far as nystagmus is concerned, working underground in daytime is a mistake, as the miner in doing so loses his opportunity of refreshing the eye by looking at colours in daylight, and so, in a measure, compensating himself for working by artificial light without colour relief. To get this relief the hours of work might be altered. To prevent unnecessary fatigue to the eyes removable shades should be provided for the lamps, so that they give out light in front only when going underground to and from the face." Finally, since in the author's view the essential cause of nystagmus is absence of colour, he suggests that "the roof, the leeward sides of the posts and collars, the cogs and sides of the alleyways be coloured with some light but inexpensive wash—whitewash, or, preferably, green or other varied colours." "The colouring would have to be done daily and would cost money; but nystagmus costs money." "If a quarter of the sum lost (*i.e.*, by miners and employers together), through nystagmus were spent in continually colouring the mine, and was enough to bring its colour relief up to the level of a lead mine, I do not see why nystagmus should not be abolished, and the other three-quarters of the loss wiped out."

Elworthy's medical treatment is mainly on conventional lines; *viz.*, rest, sedatives at first followed by stimulant tonics later on, eye shades, coloured glasses, and the correction of errors of refraction. ERNEST THOMSON.

XV.—REMEDIES.

- (1) Cusner. —Epithelioma of the eyelids cured by applications of formol. (Cancroïde des paupières guéri par les applications de Formol.) *Bull. de la Société belge d'Ophthalmologie*, No. 27, 1909, p. 40.
- (2) Bennett, William. —"Subjects of surgical interest." (Aluminium acetate in ophthalmia tarsi.) *Lancet*, August 20th, 1910.

- (3) **Luppino, Andrea.**—A clinical and experimental contribution to the employment of rabbit's bile in *ulcus serpens corneæ*, produced by the diplococcus of Fraenkel. (Contributo clinico e sperimentale sull'impiego della bile di coniglio nell'*ulcus serpens corneæ*, prodotto dal diplococco di Fraenkel.) *La Clin. Oculist.*, August, 1910.
- (4) **Dinkelspiel, M. R.**—Preliminary communication on a new method for the prevention and treatment of sympathetic ophthalmitis. *Journ. Ophthalmology and Oto-Laryngology*, November, 1910.

(1) **Cusner**, of Brussels, cured an epithelioma of the eyelids by touching it some twenty times in the course of forty-five days with solutions of formol, varying in strength from 5 per cent. to 10 per cent. The neoplasm, which had been present for twelve months, involved the caruncle and the inner canthus of the eye.

SYDNEY STEPHENSON.

(2) In a letter to the Editor of the *Lancet* (under the above general heading, which refers to the title of an address by Mr. H. F. Waterhouse), **Bennett**, of Manchester, says that a girl of 14 years in whom "a very pleasing countenance" had for months been disfigured by ophthalmia tarsi, became completely cured by the use of a lotion composed of 5 grains of aluminium acetate to the ounce of distilled water. Previously to the use of the aluminium acetate, she had used various lotions and ointments, prescribed by others, without success.

ERNEST THOMSON.

(3) Several experimenters have attempted to treat hypopyon-keratitis by means of rabbit's bile since Neufeld, in 1900, announced the discovery of a specific action of the bile salts on the diplococcus of Fraenkel. Some have used fresh bile; others, solutions of bile salts. The results of the investigations seem to indicate that the latter are not so efficacious as the fresh bile, and therefore in the trials which he records, **Luppino** has made use of bile itself. One result early shows itself, *viz.*, that the bile is not innocuous to the eye. This has not been pointed out before. It has an action analogous to that of a caustic, which shows itself subjectively as a sharp burning pain, and objectively by oedema of the conjunctiva, slight mucous discharge, and haziness of the cornea, with desquamation of the corneal epithelium. Clinically, no doubt is left on the author's mind that bile has a powerful action as regards the cure of hypopyon-ulcer as long as the latter is of medium intensity. Experiments on rabbits seem to confirm the clinical results.

The permanent opacity of the cornea, left after the prolonged use of bile, is a bar to its persistent employment.

HAROLD GRIMSDALE.

(4) **Dinkelspiel**, of Wilkesbarre, has obtained striking results in a series of cases of sympathetic ophthalmitis, and certain diseases of the uveal tract, from the internal administration of urotropin. To adults he has usually given 40 to 80 grains a day in ten grain doses.

SYDNEY STEPHENSON.

BOOK NOTICES.

Ocular Disease among the Insane. (*Las Enfermedades de los Ojos en los Dementes.*) By Dr. FRANCISCA M. FERNANDEZ. Mexico: Talleres Tipográficos de *El Tiempo*, Primera de Mesones núm. 18. 1909.

This is a little *brochure* of sixteen pages, in which the author, who is oculist to the Insane Asylum of Cuba at Mazorra, recounts the result of his ophthalmic experience at that institution. He does not claim to offer anything new. The relative proportion of the defects discovered was much the same as that which would be found among the outside population. Pterygium seemed to be very common, but it is very frequently seen in hot dusty climates. Ectropion was common, generally as the result of an accident. Operations did well. But an extraction was lost because the patient tore off her bandages, and rubbed a filthy rag into the eye; infection and suppuration followed.

The Refractive and Motor Mechanism of the Eye. By WILLIAM NORWOOD SOUTER, M.D. Philadelphia: The Keystone Publishing Co. 353 pages and 148 illustrations. 1910. Price 8s. 4d., post paid.

The volume before us is one which, we expect, will appeal rather to those who are specially engaged in refraction work than to the general student of ophthalmology. It is largely taken up with the principles of optics, and with the *rationale* of the optical treatment of ocular anomalies. It stops short at surgical treatment, referring the reader to "works dealing with ophthalmic surgery."

We think that this book, with its references to standard literature at the end of each chapter, should suit the conscientious student of the subjects with which it deals, more especially, perhaps, if he be not well grounded in mathematics. The author is evidently one of the rare people who, in preparing books of this class, bear in mind that it is possible to calculate the price of herrings per dozen, when the cost of one-and-a-half is given, without resorting to algebra. In other words, the work is simply written, any trigonometry being relegated to the appendix. The subject matter is well arranged, and seems to constitute a fairly complete exposition of present day practice. The optical diagrams are numerous and very easily understood.

A Text-Book of Diseases of the Eye. (*Lehrbuch der Augenheilkunde.*) By Profs. AXENFELD, BACH, BIELSCHOWSKY, ELSCHNIG, GREEFF, HEINE, HERTEL, v. HIPPEL, KRÜCKMANN, OELLER, PETERS, STOCK. Edited by Prof. AXENFELD. Second edition. Price 14 marks (bound 15 marks.) 1911.

The first edition of this text-book appeared in 1909, and was reviewed in Volume VII. of *THE OPHTHALMOSCOPE* (p. 132). The rapid appearance of this second edition shows what a cordial reception the former has received, and that not undeservingly, for constant reference to its pages during the last year has proved it to be a veritable mine of information.

The general scheme of the work remains unaltered. The editor has unfortunately lost a valued contributor, but he has had the extreme good fortune to obtain the services of Profs. Oeller, Hertel, and Stock.

Professor Oeller has undertaken the illustration of the fundus oculi, and contributes a new set of eleven plates, containing twenty-five figures with descriptive text. The reproductions are exceedingly well carried out on art paper, the original paintings are well chosen, and fully maintain the standard which Professor Oeller has set in his *Atlas*. These plates set up a new standard in text-book illustration.

In the chapter on wounds, sympathetic ophthalmia, and accident insurance, Professor Hertel describes wounds of the globe and adnexæ, with and without the retention of a foreign body, also contusions, burns from heat or chemicals, and damage by electric light, sunlight, X-rays, or radium. The treatment of various perforating wounds is clearly and concisely summarised. The use of the sideroscope is illustrated and explained, and also the methods of Röntgen photography of objects lying in the orbit. This chapter could be made more useful to English readers by including the "cross-thread localizer," so commonly used in this country for localisations in the orbit. As the work of accurate localization is usually in the hands of expert radiographers, the student or practitioner need know only the principles of the procedure, which are so readily understood when this instrument is in use.

Insurance questions have increased space allotted to them. This novel feature in a text-book is one of ever increasing importance, and information as to the financial value of varying losses of vision will be of great interest to all who have to do with compensation cases.

Professor Stock's contribution on diseases of the lacrymal apparatus is one which will be thoroughly appreciated. The subject is a difficult one to handle, and opinion is divided as to how far conservative methods should be carried in the treatment of lacrymal sac affections. A rational therapy usually is somewhere between the radical and conservative extremes, and the line taken by Dr. Stock in a concise and explicit statement of his practice commends itself at once. He is particularly clear on the indications for excision of the sac, and gives details of the operation which will be greatly appreciated. The method of extirpation of the lacrymal gland is also given.

The other chapters of the work are in the same hands as before, and slight alterations only have been made. These show the careful revision which has been undertaken, and increase the value of the book by giving a cohesion to the whole, which is usually wanting in collaborated works. Practical details, most welcome to the student, have been introduced where advisable, and in some matters the details of treatment have been revised. As an indication of modernity of its therapeutics, one could quote the use of Ehrlich's "606" in syphilis, which is advised under the diseases of the iris.

The index has been enlarged and improved. A number of excellent illustrations have been added throughout the text, and although the cost of production must have increased, the selling price remains unaltered. The success of the second edition should be assured.

ANGUS MACNAB.

The Intraocular Fluid Stream in Relationship to the Biomechanical Structure of the Eye in Health, Glaucoma, and Myopia. (Der intraokulare Flüssigkeitsstrom in seinen Beziehungen zum biomechanischen Aufbau des Auges unter gesunden Verhältnissen, beim Glaukom, und bei der Kurzsichtigkeit.) By Dr. J. KUSCHEL, Oculist at Lüdenscheid. With 18 illustrations in the text, Berlin: Verlag von S. Karger, Karlstrasse 15. 1910.

This book is in reality a reprint of a long series of articles which have appeared in the pages of the *Zeitschrift für Augenheilkunde* during the past two

years. It is composed almost entirely of quotations from German ophthalmic literature. The result is chaos—dull, dreary, incoherent, incomprehensible; a tangle, which it passes the wit of man to unravel or to digest. We have devoted many weary hours to an endeavour to extract the grain from the husks which surround it, with little success. The book is illustrated with some sketches which should help to illuminate the text, but they are numbered in a haphazard way, and have neither lettering nor description. The first has no number and is perhaps intended for a schematic eye, but it may equally be a heraldic device or an electrical instrument. There are two figures both different, numbered 3; 11 and 12 are non-existent. The figures in original articles are constantly referred to, but not reproduced, a most objectionable feature in a book which should form an independent self-sufficient whole.

The first chapter draws attention to the careful way in which nature disposes material, so as to obtain the greatest strength with the least expenditure of matter. The cancellous structure of bone and the anatomy of trees are instanced as examples. Kuschel then shows how in the eye the fibres of the sclera, vitreous, and other structures are so disposed as to meet in the best way the strains to which they are exposed. The scleral fibres are arranged tangentially; those in the vitreous radially. The connective tissue of the retina and choroid and of the nerve entrance show the same evidence of design, viewed from the engineering standpoint. The sclera is an elastic ball, so elastic that it may be held to be rigid. "Elasticity" is used in a loose sense. Here we have it meaning undistensible, but later on we find it employed to express the quality of stretching. The vitreous contains a central canal. Cloquet's canal, which has a valve-like function at its retinal end. Anteriorly, it opens into the zonular lacuna (*Spalt*) which also has a valve-like action. This lacuna is connected with the orbicular space, which communicates with the posterior chamber through the crypts in the ciliary body. There is no connection whatever between the retina and choroid anteriorly, but fluid can pass from these tissues into Cloquet's canal by lymph passages at the nerve entrance and lamina cribrosa. The chief source of the intra-ocular fluid is the choroid. The fluid secreted here passes by these channels into Cloquet's canal, which is distended, the zonula lacuna being closed. Cloquet's valve now closes and the zonular lacuna opens, the fluid fills it, and passes into the orbicular space, and reaches the posterior chamber passing out of the eye by Schlemm's canal. The driving power is the ciliary muscle, and *the muscle fibres in the choroid*. These muscle fibres have been suggested by Münch ("Ueber die muskelöse Natur der Stromazellnetzes der Uvea."—*Zeitschrift für Augenheilkunde*, Bd. XII, 1904), and Kuschel uses them to postulate a pump-like action of the choroid, which, with the aid of the hypothetical valves he describes, forces the fluid forwards. In this scheme of ocular circulation the secretion of the ciliary body finds a very subordinate place. The sponge-like action of the vitreous changes the type of the circulation from one of the rigid tube type to that in elastic tubes. In old age, sclerosis of the fibrillæ in the vitreous and of the other structures of the eye reduces the lymph circulation more and more to the type of circulation in rigid tubes, and the book tries to show how this factor induces—first, a disposition to glaucoma; then, glaucoma simplex; and, finally, acute glaucoma. Myopia is caused by the backward resultant of the pressure along Cloquet's canal.

This we believe to be the gist of Kuschel's theory, but we may have misrepresented him. The whole book is so involved, there is such endless repetition, that we hardly dare to say that we have more than grasped the

main idea. In the absence of intelligible diagrams, it seems almost impossible to get a clear idea of the exact relationship of all the complicated systems of fibres described in the retina and choroid and the fibrillæ in the vitreous. But it cannot matter much, for one has seen a large proportion of this wonderful structure of fibrillæ and valves leave the eye at an extraction, with no very obvious changes in the circulation therein, and we know that the vitreous may be absolutely fluid, and yet the circulation appears to be normal. This complicated and beautiful pump appears to work as well when the vitreous is fluid as when it is normal.

These theories are in direct antithesis to those propounded by Thomson Henderson, whose work, we may add is, as far as we can see, not mentioned in the book.

We cannot advise anyone to read Kuschel's book. The arm-chair theories advanced are not founded on any original experiments performed by the author, and in the absence of such confirmation, have little value.

T. HARRISON BUTLER.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

THE OPHTHALMIC YEAR BOOK.

To the Editor of THE OPHTHALMOSCOPE.

DEAR SIR,

The error in Vol. VII of the *Ophthalmic Year Book*, to which you kindly call attention in THE OPHTHALMOSCOPE, Vol. VIII., page 926, illustrates so beautifully the difficulties besetting the bibliographer, that I am tempted to use the illustration.

In 1909, P. Gorse (not "Gosse") wrote two articles: one upon "Optic Neuritis in Adolescence," published in *Recueil d'Ophtalmologie*, page 330; the other upon "The Treatment of Trachoma," published in the *Revue Générale d'Ophtalmologie*, page 529. Both papers are quoted in the *Year Book* in the digest of the literature, the first on page 129, the second on page 241. But in the bibliography, page 343, the title of the first paper, with the proper page of reference, is referred to the journal in which the second paper appeared; while the title of the second paper and its page are omitted.

In correcting proof errors just this kind of "mix-ups" frequently occur, and it is extremely difficult to prevent some of these from going undetected. It is desired to keep the *Ophthalmic Year Book* as free from errors of any kind as it is humanly possible, and it is considered an especial favour for anyone noticing such mistakes to call the writer's attention to them.

Cordially yours,

EDWARD JACKSON.

Metropolitan Building,
1434, Glenarm Street, Denver, Colo.
December 13th, 1910.

NOTES AND ECHOES.

Deaths.

EVERY reader of THE OPHTHALMOSCOPE will learn with deep regret of the death of Henry Power, which occurred on January 18th, at the age of 81 years.

Mr. Power retired from active practice several years ago, when he went to live at Bagdale Hall, a delightful old house at Whitby, Yorkshire, where his death took place. He retained his faculties to the last, and as recently as December last a review from his facile pen appeared in our columns. A letter was received from him by the Editor of THE OPHTHALMOSCOPE on January 9th



The late Mr. Henry Power.

last (nine days before his death), in which appeared the following pathetic and prophetic words:—"I write a line to say good-bye to you, for I am soon going the way of all flesh, and time, too, you will say, at 82. I am troubled with a dilated right heart, I have incipient cataract in the left eye, and I have become hard of hearing, so the machine is giving way at many points. Adieu!"

Henry Power, ophthalmologist, anatomist, physiologist, and man of heart and of letters, was the son of the late Lieut.-Col. John Francis Power, King's German Legion. He was educated at Cheltenham College. For many years he was surgeon to the Royal Westminster Ophthalmic Hospital, and in that

capacity endeared himself to successive generations of ophthalmic students. It was a liberal education in itself to watch the perfection of his operations, especially for the removal of cataract. Mr. Power was also ophthalmic surgeon to St. Bartholomew's Hospital, London, where, by the way, he received his professional education. Other offices held by this distinguished man included the presidency (1890-3) of the Ophthalmological Society of the United Kingdom, and the vice-presidency of the Royal College of Surgeons of England, where he had been Arris and Gale lecturer on anatomy and physiology. He was co-editor of the *Lexicon of Medicine and the Allied Sciences*. Indeed, his achievements in the several departments of medicine and surgery were wide, a true index of the many-sided character of the man himself. But long after these things are forgotten, the fragrant memory of a kind and courtly soul will remain to remind many friends and admirers of Henry Power. May he rest in peace!

The following has been contributed by Mr. Gustavus Hartridge :

"As a pupil, colleague, and friend for many years of the late Henry Power, I am glad to place on record my appreciation and admiration of one of the finest characters that it has been my privilege to know. Endowed with a handsome presence, a generous and happy disposition, he was beloved by all who came in contact with him.

"No one knows better than I do of Henry Power's many acts of kindness which never saw the light of day; to the poor he was generous to a fault, and at the hospital his hand was frequently in his pocket, though I fear his generosity was sometimes taken advantage of.

"His opinion was always eagerly sought and much valued by his colleagues, and by the death of Henry Power ophthalmology has lost one of its brightest and best representatives."

12, WIMPOLE STREET, W.
January 21st, 1911.

Appreciation of Mr. Henry Power by Mr. Walter H. Jessop :

"To his colleagues and friends the news of the death of Henry Power came as a great shock and grief. Age sat so lightly on his shoulders that few credited him with his eighty-one years. Descended from a race of Irish soldiers, who had fought well for King and Country in most of the Peninsular battles, and at Waterloo, he has inherited from them those fine qualities which always distinguished him.

"The handsome face with the unclouded brow gave evidence of the happiness and single-heartedness of the man, and encouraged everyone to trust him implicitly. It was an impossibility to imagine his uttering a disparaging word of anyone, and no man was ever more free from enemies. He was an excellent conversationalist and took the keenest interest in everything and everyone. I have never known anyone more quickly grasp and assimilate a subject. This faculty made him a most successful teacher, and as a lecturer he was rarely surpassed. His fine presence, cultivated voice, elegant diction, and clear method of demonstration attracted and kept interested all his hearers. So wedded was he to lecturing that only three months before his death he was giving popular lectures at Whitby.

"As a surgeon he was an excellent and very successful operator, and always asserted the great advantage he possessed from having been for ten years surgeon to a general hospital.

"The members of the Ophthalmological Society will remember the dignity and tact with which he filled the Presidential Chair, and also the great hospitality displayed to them by Mrs. Power and himself.

"It was, however, as a colleague that his absolute sincerity of purpose was most evidenced. For twenty-four years he worked at St. Bartholomew's Hospital with Mr. Vernon as his junior colleague, and never was a happier partnership.

"His own words in the obituary notice of Mr. Vernon describe well the relations we all learnt to reverence. 'The two surgeons worked together in the most harmonious way, often making their rounds together; sometimes one, sometimes the other, monopolising the wards.'

"I cannot do better than end this short appreciation by quoting the words from his Presidential Address to the Ophthalmological Society as to his ideas, exemplified in himself, of the proper qualifications for men desiring to become oculists. 'They should at least have had a sound mathematical education; they should be familiar with the science of optics; they should have made themselves masters of microscopical methods and proceedings; they should have good eyes, and should have cultivated lightness, and steadiness, and precision of hand. Finally, they should be sympathetic and gentle.'—*Royal Ophth. Soc.* Vol. XI, p. 8.

"Though gone to that bourne from which no traveller returns, Henry Power has bequeathed us an example, which will never be forgotten by those recording the man. *Vivit post funera virtus.*"

WITH regret we announce the death of George J. Bull, which occurred at Paris, on New Year's Day, 1911. The funeral took place at Père Lachaise on January 4th.

Dr. Bull had enjoyed for many years an extensive practice amongst English and Americans in Paris, where he was attached as ophthalmic surgeon to the Hertford British Hospital and to the American Hospital at Neuilly. He was also honorary secretary and treasurer of the Continental Anglo-American Medical Society. Dr. Bull was a Canadian by birth. He obtained his degree of M.D. and C.M. at McGill University, Montreal, in 1869. After being for some eight years in general practice at Worcester, Mass., U S A., Bull took up the practice of ophthalmology at Denver, but he soon went to New York, where he became connected with the Manhattan Eye and Ear Hospital and the Post-Graduate Medical School. In 1886, he settled in Paris, where he held an ophthalmic post in connection with the Sorbonne, and was associated in practice with the late Dr. E. Javal. He took the degree of M.D. Paris. He became a member of the Ophthalmological Society of the United Kingdom in 1893. Dr. Bull's scientific contributions dealt mainly with optometry, the treatment of strabismus, and the problems of errors of refraction and of accommodation. His communication upon "Lid pressure on the Cornea," read at the eighth International Ophthalmological Congress at Edinburgh in 1894, was particularly well-known to English ophthalmic surgeons. Dr. Bull was 62 years of age at the time of his death. We have good reason to believe that Dr. Bull's professional and social merits would have received substantial official recognition, had his life been spared but a few months longer. We tender sincere sympathy to his wife, Madame Bull, and to his mother, Madame Richard Bull.

On January 13th an inquest was held on the body of James Thomas James, aged 54 years, who was found, on the 10th instant, dead at his house in Harley Street, London, with his throat cut and a razor lying by his side. It

was given in evidence that he was subject to fits of depression, in one of which he appears to have ended his life. The jury returned a verdict of "Suicide while temporarily insane." The deceased was formerly connected with the Central London Ophthalmic Hospital, W.C. He was also a member of the Ophthalmological Society of the United Kingdom.

From America the deaths are announced of E. J. Abbott (Chicago), Walter E. Delabarre (New York), and William R. Hobbs (Omaha).

The death is announced of Dr. Maximo Cienfuegos, professor of ophthalmology in the University of Santiago, Chile.

* * * *

Appointments. MR. GEORGE W. THOMPSON has been appointed ophthalmic surgeon to the Hospital for Epilepsy and Paralysis and other Diseases of the Nervous System, Maida Vale, London.

Mr. E. Arthur Dorrell, has been appointed assistant surgeon to the Royal Eye Hospital, Southwark, London.

Mr. Hamilton Ernest Quick, has been appointed assistant ophthalmic surgeon to the Swansea Hospital.

Messrs. J. X. Robert, J. B. Martin, D. J. McRae, and W. H. Eales have been appointed resident surgical officer, senior, second, and junior house surgeon respectively to the Birmingham and Midland Eye Hospital.

Drs. Eugene Smith and Robert Gillman have been appointed ophthalmologists to the House of Providence Hospital, Detroit.

Dr. Kurt Adam has been recognised as *privat-doцент* of ophthalmology in Berlin, and Dr. M. Zade in Heidelberg.

* * * *

The Order of St. John. DR. ANGUS MACGILLIVRAY, the well-known ophthalmic surgeon of Dundee, has been enrolled as an honorary associate of the Grand Priory of the Order of the Hospital of St. John of Jerusalem in England.

* * * *

The Moorfields Hospital. HER MAJESTY THE QUEEN has graciously consented to become Patron of the Royal London Ophthalmic Hospital.

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Belgian Ophthalmological Society. ANGELUCCI, of Naples, Axenfeld, of Freiburg, Hess, of Würzburg, Jessop, of London, Landolt, of Paris, and Straub, of Amsterdam, have been nominated honorary members of the Belgian Ophthalmological Society,

* * * *

Professor Fuchs. PROFESSOR FUCHS has been nominated an honorary member of the *Berliner Medizinische Gesellschaft*.

* * * *

Honours. MR. J. B. STORY, member of the Council of the Royal College of Surgeons in Ireland, and surgeon to the Royal Victoria Eye and Ear Hospital, Dublin, has been appointed High Sheriff of County Tyrone.

The title of professor has been bestowed upon Dr. Brückner, of Königsberg, in Prussia.

* * * *

Committee on Colour Blindness. A communication has been addressed by Dr. F. W. Edridge-Green to the President of the Board of Trade, commenting (as we did some little time ago) upon the composition of the Committee on colour vision appointed by the department. He complains that the views he has promulgated with such conspicuous energy go almost unrepresented, while the more or less discredited Holmgren wool test has able exponents on the committee. "The president of the old committee that recommended the wool test is on the committee," writes Dr. Edridge-Green, "and the Secretary is a physicist who employs the condemned method, and is a strong advocate of the wool test." "I have done everything in my power," continues Dr. Edridge-Green, "to help the committee to come to a correct conclusion and shall continue to do so. They have, however, made this very difficult for me, as I wished to make it a condition that I should be present when they examined any of my colour-blind cases, men who were able to pass the Holmgren test. This they refused, so I withdrew the condition, but had they acceded this letter would never have been written." From a scientific point of view, it is singularly unfortunate that Dr. Edridge-Green has not been included in the committee. Is it too late to repair so obvious an omission?

* * * *

Notification of Ophthalmia Neonatorum. THE *Lancet* (December 3rd, 1910) refers to and quotes from the report by Dr. Dudfield to the Public Health Committee of the Borough of Paddington, in which Dr. Dudfield sets forth the need for notification and more efficient treatment of ophthalmia neonatorum on the basis of statistics based on recent literature, and points out that Mr. Sydney Stephenson's monograph on *Ophthalmia Neonatorum* seems to have escaped attention. If this is so, the report must surely be in a position similar to that of "Hamlet" without the Prince of Denmark. However that may be, the important part is that the London County Council, at its meeting on November 8th, decided to enforce the powers granted by the Public Health (London) Act, 1891, making ophthalmia neonatorum compulsorily notifiable.

* * * *

Proposed Optical
Convention in 1912.

A general meeting of opticians and others interested was held in the rooms of the Chemical Society, Burlington House, on Tuesday, November 29th, to consider the desirability of making arrangements for the holding of an Optical Convention in 1912. The chair was taken by Dr. R. T. Glazebrook, C.B., F.R.S., as Chairman of the Permanent Committee. A resolution was carried, *nem. con.*, that, provided sufficient financial support is obtained, an Optical Convention be held in the spring or early summer of 1912. The main objects of such a Convention were specified as being (i) the holding of an exhibition of optical and allied instruments; (ii) the preparation of a catalogue of optical and allied instruments of British manufacture to serve as a convenient work of reference for all users of optical and scientific instruments; not necessarily to be limited to instruments actually exhibited; (iii) the holding of meetings for the reading of papers, and for discussions and demonstrations on optical subjects; (iv) the publication of a volume of *Proceedings*, in which these papers would be collected together. The questions of the inclusion of a foreign section, and of the scope of the convention and exhibition were discussed, and an Organising Committee was nominated, to undertake the work of making the necessary arrangements for the convention.

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Bowman Lecture.

THE Bowman Lecture of the Ophthalmological Society of the United Kingdom will be given by Dr. Landolt, of Paris, on Wednesday, June 7th next. The subject will be:—"Ophthalmic Surgery."

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American Academy of
Ophthalmology and
Oto-Laryngology.

THE next annual meeting of the Academy will be held at Indianapolis, Ind., on September 25th, 26th, and 27th, 1911, with Dr. John J. Kyle as president.

* * * *

Moorfields Hospital
Annual Dinner.

THE fifth annual dinner of past and present students of the Royal London Ophthalmic Hospital will take place at the Imperial Restaurant, Regent Street, W., on Wednesday, February 8th, when Mr. Priestley Smith will take the chair at 7.45 p.m. Each student is entitled to introduce two guests. Tickets (10s. 6d. each, exclusive of wine) may be obtained from either of the honorary secretaries, Mr. Arnold Lawson, 12, Harley Street, and Mr. J. Herbert Parsons, 54, Queen Anne Street, London, W.

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Dr. Joseph Nelson's
Will.

THE late Dr. Joseph Nelson, Belfast, ophthalmic surgeon to the Belfast Royal Hospital and to the Belfast Hospital for Children, left personal estate valued at £13,369.

* * * *

British Medical
Association, 1912.

THE annual meeting of the British Medical Association will be held at Birmingham from July 25th to July 28th, 1911. The following are the officers of the Section of Ophthalmology :—

President.—HENRY EALES, Birmingham.

Vice-Presidents.—EDWARD WILLIAM WOOD WHITE, Birmingham ; HENRY SECKER WALKER, Leeds ; JOHN GRAY CLEGG, Manchester.

Honorary Secretaries.—ROBERT JAMES COULTER, Bryn Ivor, 11, Clytha Park Road, Newport, Mon. ; JOHN JAMESON EVANS, 85, Edmund Street, Birmingham ; WILFRID ALLPORT, 95, Cornwall Street, Birmingham ; ARTHUR WILLIAM ORMOND, 7, Devonshire Place, London, W.

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THE OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

VOL. IX.—No. 3.]

MARCH 1, 1911.

[TWO SHILLINGS.

CONTENTS.

Original Communications.—

	PAGE
1. Sydney Stephenson.—On the Oculo-motor type of Polio-encephalitis	164
2. Robert Scott Lamb, M.D.—Metastatic Abscess of the Episclera, with report of a case	168
3. Eric Pritchard, M.A., M.D., M.R.C.P.—Intermittent Word-Blindness	171
4. Lee M. Francis, Ph.B., M.D., and James A. Gibson, M.D.—The Anatomical Relation between the Sphenoidal Sinus and the Orbit: Observations upon 100 Skulls	172
5. Charles Goulden, M.A., M.B., M.C., F.R.C.S.—Some Inflammatory Eye Conditions due to Oral Sepsis	177

Clinical Memoranda.—

1. Ernest Thomson, M.D.—On Protargolage in the Treatment of Trachoma	181
2. S. Handford McKee, B.A., M.D.—Headache associated with Diplobacillary Conjunctivitis	182
3. J. Augustus Lea, M.B., F.R.C.S.E.—The Use of Salicylate of Potash in Cyclitis	183

Review.—

Ocular Sporotrichosis. By Dr. R. Jocqs	184
---	-----

Translation.—

A Note on the method of Insertion of the Fibres of the Zonule of Zinn into the Anterior Capsule of the Crystalline Lens. By Dr. Eugenio Aguilar	188
--	-----

Current Literature.—

I. Comparative Anatomy of the Eye... ..	190
II. Comparative Pathology	192
III. The experimental production of Abnormalities of the Eye	193
IV. Experimental Trypanosomiasis of the Eye	194
V. Sporotrichosis	195
VI. Embolism of the Arterial Circle of the Cornea	198
VII. Infections	199
VIII. The Schiötz Tonometer	202
IX. Facettes in the Cornea	204
X. Foreign Bodies in Eye or Orbit	205
XI. Congenital Word-Blindness	207
XII. Disturbances of Circulation	208
XIII. Convoluted Vessels in Simple Glaucoma	210
XIV. Traumatic Enophthalmos	211
XV. Operations	213
XVI. Remedies	218
Book Notices	225
Notes and Echoes	228

ORIGINAL COMMUNICATIONS.

ON THE OCULO-MOTOR TYPE OF POLIO-ENCEPHALITIS.*

BY

SYDNEY STEPHENSON,

LONDON, ENGLAND.

Introduction.

EVERYBODY now recognizes that there exists an acute, primary, specific disease affecting the grey matter of the brain. This malady, known as "encephalitis" or "polio-encephalitis," was first described by Strümpell in the year 1884. It is comparable with acute anterior polio-myelitis ("infantile paralysis"), and, like that disease, occurs in children, is of acute onset, and tends towards recovery. It may or may not be associated with such general symptoms as fever, convulsions, drowsiness, stupor, loss of consciousness, coma, headache, nausea, and pronounced irritability. The special symptoms produced by the disease depend, of course, upon the particular region of the grey matter of the brain involved. For example, polio-encephalitis superior, which affects the nuclei of the cerebrum and cerebellum, may give rise to mental changes, hemiplegia, diplegia, ataxia, or disturbances of equilibrium, while polio-encephalitis inferior, which affects the nuclei of the pons and medulla, may cause paralysis of one or several of the cranial nerves or acute bulbar palsy. The essential pathological changes appear to be thrombosis of the smaller blood-vessels, together with hæmorrhages into the grey matter and cellular exudation.

The evidence, both clinical and pathological, goes to show that affections of the grey matter, whether of the brain or of the spinal cord, are in reality one and the same disease, and are probably due to a single factor, be it infective or toxic in nature. The two affections may occur in epidemics, in which some members of the same family may suffer from the spinal and others from the cerebral variety. Indeed, cases are known where eye symptoms, as ptosis, ophthalmoplegia, and pupillary changes have been associated with an affection of the spinal cord, and the combined condition has then been termed *polio-encephalomyelitis* (B. Sachs).

The Oculo-motor type of disease.

For some years I have been familiar with a group of cases, the chief characteristic of which is the sudden onset of paralytic squint at an age when squint is not altogether common. The cases are met with in children, often of tender years. The condition may arise without obvious cause. On the other hand, it may be observed after some childish ailment, as scarlet fever or measles, and I have known it follow an injury, a fright, or some trifling operation, as vaccination or circumcision. The child, often apparently in his usual health, is put to bed, and on awaking next morning, is found to present a squint, a thing never noticed by his parents before. The family physician is summoned. He surmises that "there has been a fit in the night," and that is the usual explanation offered by the mother when she brings her child to hospital or elsewhere for advice about the eyes.

* A communication read on February 24th, 1911, before the Royal Society of Medicine, Section for the Study of Disease in Children.

In my experience, the condition, as described above, is far from uncommon. The clinical material at my disposal is not large. Yet I have had no difficulty whatever in collecting twenty-eight examples of the disease.

My observations lead me to conclude that the oculo-motor symptoms in these cases depend upon an acute focal encephalitis, quite analogous with the better known forms of that disease.

That the condition should so far have escaped general recognition is probably due to the fact that in three-fourths of the cases the external rectus of one eye is alone affected, so that on casual examination of the child in the out-patient room, the condition passes as an example of the convergent concomitant strabismus so familiar in childhood. In the rarer event of ocular muscles other than the external rectus being involved, however, the paralytic nature of the squint could scarcely be overlooked. Finally, another reason why the significance of the eye symptoms is apt to be missed lies in the fact that in upwards of two-thirds of the children there is no obvious disturbance of the general health.

In endeavouring to construct briefly the symptom-complex of the disease outlined above, I shall draw upon the notes of twenty-eight such cases which I possess. The following points will be taken up, and examined in the light afforded by the figures in my possession.—(1) Sex ; (2) age when seen ; (3) age of onset ; (4) the influence of other illnesses, etc. ; (5) the associated signs and symptoms ; and (6) the nature of the oculo-motor manifestations.

1. *Sex*.—My list of 28 cases includes 16 females and 12 males, from which we may probably conclude that sex has no particular determining influence upon the incidence of the disease.

2. *Age when seen*.—The patients came under notice at ages that varied from 3 months to 30 years, the average in months being 78·8.

3. *Age of onset*.—The age of onset ranged from shortly after birth to 4½ years. The average of the 28 cases, stated in months, was 19·1. To put the matter in another way, of the total cases, 14, or exactly one-half, began in the first year of life.

For purposes of comparison it may be stated that in a series of 1,017 cases of unilateral convergent squint tabulated by Mr. Claud Worth (*Squint: its Causes, Pathology, and Treatment*, 1903, p. 41), only 134, or 13·17 per cent., began in the first year of life.

The age incidence of the two affections, ordinary strabismus, and the strabismus of polio-encephalitis, is well brought out by the following table :—

					<i>Age of onset.</i>	
					<i>Ordinary Strabismus.</i>	<i>The squint of Encephalitis.</i>
Under 1 year	...	...	...	...	13·17	50·00
Between 1 and 2 years	...	...	...	...	18·30	7·14
Between 2 and 3 years	...	...	...	...	24·29	10·72
Between 3 and 4 years	...	...	...	...	18·58	25·00
Between 4 and 5 years	...	...	...	...	11·11	7·14
Between 5 and 6 years	...	...	...	...	7·18	
After 6 years	...	...	...	...	7·37	

From an examination of the foregoing figures, we conclude, then, that the age incidence of the disease under discussion offers considerable contrast with that ascertained by Worth for cases of ordinary convergent squint.

4. *Other illnesses*.—In fifteen of my cases, or 53·57 per cent., the squint was immediately preceded by some condition that might possibly have been

the cause of the brain mischief. Thus the list included several zymotic ailments, as measles (2), scarlet fever (1), influenza (1), whooping cough (1), and modified small-pox (1). A fall on the head was assigned as the cause of the squint in five children and a fright in one child. Circumcision had been performed shortly before squint was noticed in one child. Other suggested causes were teething (1) and "wasting" (1).

5. *Associated signs and symptoms.*—The next point for examination is with regard to the frequency and nature of any general symptoms, such as might indicate an affection of the brain, in association with the oculo-motor signs. One point was very striking, namely, that in more than two-thirds of the patients (67·85 per cent. to be precise) the squint was not preceded, accompanied, or followed by any disturbance of the general health of a sufficiently pronounced nature either to arouse the solicitude or to impress the memory of the children's parents. In the remaining eight cases, associated symptoms were "fits" or "convulsions" in five, combined with unconsciousness in two of these patients. In a sixth child there was a history of coma lasting for three days. A seventh patient was noted as being "sleepy, and wanting to lie about" coincidently with the appearance of the eye symptoms, and in the eighth patient, the latter were associated with torticollis. One interesting case calls for a word or two of separate mention.—The patient was circumcised when aged two months, a little operation that was speedily followed by paralysis of one external rectus muscle. Six years later the right leg became paralysed, apparently from acute anterior polio-myelitis.

Family predisposition to the disease was suggested by one of my cases, where an infant, aged three months, on recovery from "fits" and a period of unconsciousness, was found to have paralysis of one external rectus muscle. An elder sister of this patient suffered from paralysis of the left hand and arm at three months, and three months later, the right eye "got fixed in the corner."

6. *Nature of the Oculo-motor Symptoms.*—This is scarcely the occasion to enter into anything like a minute analysis of the oculo-motor signs of the malady. It will suffice to say that any of the extrinsic muscles of the eyeball, either singly or in combination, may be attacked, although in three-quarters of my cases the external rectus was alone affected. Paresis was more common than paralysis of the muscle. I have never yet been able to satisfy myself that both external recti muscles were involved, although such may readily have been the case. The squint is born, as it were, fully fledged, an instructive contrast with the ordinary form, which tends at first to be occasional and to alternate between the two eyes and to get worse with the lapse of time. The squint of polio-encephalitis, in my experience, does not usually get more marked. It may, on the contrary, improve or even disappear as time goes on. In older children diplopia may be complained of, and a more or less characteristic carriage of the head may sometimes be seen. Nystagmus was noted in three patients. In one patient there was reason to think that the intrinsic muscles of the eye, the sphincter pupillæ and the ciliary muscle, shared in the paralysis. In that patient, a woman twenty years of age, whose symptoms had followed a fall on the back of the head at two years of age, all branches of the third nerve to the extrinsic muscles of the eye were paralysed, so that the only movements retained were outwards (sixth nerve) and downwards and outwards with rotation (fourth nerve). The pupil, considerably larger than that of the other eye, was motionless to light. The patient could read only large print (No. 16 Jaeger) with the affected eye. The eye was somewhat prominent, and its palpebral fissure was wider than the one of the other eye. There was no affection of the fifth or facial nerves.

Diagnosis.

The diagnosis of the oculo-motor type of encephalitis may be simple or the reverse. No difficulty is likely to arise unless the external rectus is alone affected, but that, as already stated, occurs in three out of four of the cases. An upward, downward, outward, or intermediate paralytic squint, suddenly making its appearance in a baby under twelve months, could scarcely be due to anything else than an acute affection of the nuclei of the nerves which supply the extrinsic muscles of the eye. Things are different when the external rectus muscle is alone involved. In marked cases, when the child is old enough to follow a bright object with his eyes, a defect will be found in the outward rotation of the squinting eye. The eye, perhaps, cannot be moved beyond the mid-line of the orbit. But it is commoner for the outward excursion of the affected eye merely to fall short of that accomplished by the sound eye. In milder cases still, or when the defect is of long standing, nothing more may be observed save a lack of smoothness in the lateral excursions of the eyeball. The affected globe moves outward with the consentaneous inward movement of the sound eyeball, but in a jerky fashion. "The eye drags" is an expression I have heard used both by mothers and by medical men. The eye may be said "to lose time," as it were, like a defective fine adjustment of a microscope. There is another sign that I have found useful.—It is that when the child is told to look in the direction of action of the affected muscle, he instinctively turns not his eye but his head, which is not the case, at all events to the same extent, when the corresponding muscle in the other eye is called into play.

Conclusive evidence is to be sought in an examination of the tiny bright images reflected from the corneæ when a source of light, such as that afforded by a candle flame or an ophthalmoscopic mirror, is held before the eyes. Under these circumstances the bright spot of light will occupy approximately the centre of the cornea of the unaffected eye, while in the other eye it will be displaced in a direction opposite to that of the squint. Thus, in convergence, the bright reflex lies somewhere to the outer side of the centre of the pupil; in divergence, to the inner side of that point; in upward squint, below the centre; and in downward squint, above the centre. The extent of the displacement will be directly proportionate to the degree of deviation of the eyeball. For that matter, once we know the position occupied by the corneal reflex, it becomes easy to convert our knowledge into terms of the angular measurement of the squint for future reference. A schema for this purpose has been drawn up by Hirschberg (*Centralbl. f. prak. Augenheilkunde*, 1886, p. 5). The method, although possibly a little rough and ready, is adequate for practical purposes, especially in children.

An estimate having been formed by the surgeon of the degree of the "primary deviation," i.e., the deviation of the squinting eye, he next covers the sound eye and gets the child to fix the light with the affected eye. When this movement is correctly executed, the sound eye, so to speak, takes on the squint. The degree of this so-called "secondary deviation" is next estimated. In ordinary concomitant strabismus the primary and the secondary deviations are equal, but in paralytic strabismus, such as that due to encephalitis, that is no longer the case. In those circumstances, for reasons that are so well known that they need not be explained here, the secondary deviation is bigger than the primary.

Having ascertained by examination of the corneal reflexes or by other means that an extra-ocular muscle is paretic, there may still be a doubt as to the cause of the condition if the history of the case be defective, as it some-

times is in hospital out-patients. Such a condition may in reality belong to the group of congenital paralyses, the commonest example of which is paralysis of the external rectus muscle in one eye or in both. I am not prepared to suggest any means whereby these two conditions can be distinguished in the absence of a trustworthy history of the case, unless it be by the electrical examination of the affected muscles, no simple matter when dealing with the eye of a young child.

Conclusions.

1. There is a particular form of paralytic strabismus in children which is due to polio-encephalitis.
2. It is not uncommon, and is most frequent in children under one year of age.
3. It is associated comparatively seldom with other symptoms indicative of a cerebral disorder.
4. Zymotic diseases appear to be important factors in its causation.
5. Although the paralysis may affect any of the extrinsic muscles of the eyeball, yet in three-fourths of the cases the external rectus muscle is alone involved. The intrinsic musculature of the eye is seldom attacked.
6. The common form of encephalic strabismus is very apt to be confused with the ordinary form of concomitant convergent strabismus.

METASTATIC ABSCESS OF THE EPISCLERA, WITH REPORT OF A CASE.

BY

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Introduction.

IN looking over the literature which might contain cases of a somewhat similar nature to the one which it will be my pleasure to report, I found nothing very like it. Some case-reports have, however, been sufficiently similar to warrant their brief abstract before proceeding to report my own case.

The first of these is reported in the *Transactions of the Medical Society of Tennessee*, 1886, page 117, occurring in the practice of T. J. Happel, a general practitioner, who conducted his case for some time before calling in an ophthalmic surgeon. The report is dated July, 1885. The abscess was located in the sclera about $\frac{1}{4}$ inch from the cornea, and occurred one week after the first symptoms of general malaise and supra-orbital neuralgia. It was about twice the size of a pea. The eye was protected from light, and treated with frequent baths of tepid water and instillations of a solution of atropine, containing $\frac{1}{4}$ grain to the ounce. As the "core" would not come away of its own accord, the patient was taken to an oculist in consultation. He removed the slough and much of the redundant conjunctiva with curved scissors. Rapid recovery followed.

The next case was reported (*Wien. med. Presse*, 1889, Bd. XXX, S. 607-609), by Dr. Hans Adler of the Wieden Infirmary, Vienna. That author gave a most interesting and elaborate report, including bacteriological findings, and an excellent description of his treatment. The patient, a woman 65 years of age, had cryptogenic bronchitis; three weeks later, pain occurred in

the left shoulder, and extended to the left side of the head and eye. The following day the eye became inflamed, and on the fifth day after the irritation, the shoulder pain had disappeared, and the left eye showed reddened lids, narrowed palpebral fissure, and swollen palpebral and bulbar conjunctiva, which was chemotic at the outer portion; cornea clear, anterior chamber slightly shallow, iris swollen, and pupil somewhat contracted. Pain increased, and on the eighth day a bulging occurred in the outer-lower quadrant underlying the bulbar conjunctiva. It was yellowish, transparent, and even now recognised as an abscess. It was 2 mm. distant from the limbus, 1 mm. in diameter, and 3 mm. high; it felt like a cyst, and did not extend beyond the sclera. On the thirteenth day a yellowish point appeared on the apex, and on light pressure, a few drops of pus were squeezed out, and the pain subsided. The patient's appetite improved and slowly she recovered a general feeling of well-being. The chemosis gradually subsided, and suppuration became more abundant but finally subsided on the thirtieth day after the patient was first seen. The palpebral conjunctiva was pale, and on the site of the former abscess there was a round puckered appearance of the parts, with a small cavity in the centre. The treatment consisted in continuous applications of mercury bichloride (1:3,000) and once daily atropine instillations. Concomitant with the abscess formation, a subacute irido-choroiditis occurred. By the thirty-eighth day the eye was perfectly clear, the tension was normal, the field was normal, colour sense was normal, and acuity of vision was increased from 6/30 to 6/16. The pus from the abscess contained *staphylococcus pyogenes aureus*. In conclusion, Adler gives a very logical differentiation of the probable metastatic origin of the abscess.

Another case was reported by G. E. de Schweinitz in the *Philadelphia Hospital Reports* of 1893, Vol. XI, p. 209. There was an elevation, about the size of a pea, in the lower and outer portion of the bulbar conjunctiva, tender to touch, and covered with a leash of coarsely injected superficial conjunctival vessels. The mass was slightly fluctuant, somewhat movable beneath the conjunctival covering, and was evidently situated in the subconjunctival tissue. It was incised, without puncturing, and found to be a circumscribed abscess or an encysted abscess. The interior of the cavity contained a drop or two of purulent matter. The walls presented a typical pyogenic membrane, external to which the subconjunctival tissue and overlying conjunctiva were densely matted into a resistant wall.

In 1902 there appeared in the *Militärärztliche Wien*, and also in the *Wien. klin. Wochenschrift*, a report of a rare case of metastatic abscess in the sclera by Surgeon-General Dr. Boguss, the patient, a male, having a general pyæmic infection, with swelling of the joints and septic neuritis. In the sclera of the right eye, near the outer margin of the cornea, was a collection of pus, about the size of a pea, and near it were three other smaller foci developed close to the periphery of the cornea. There was an exudation of pus in the anterior chamber, following which the cornea became dull in the outer and lower portion and keratitis profunda followed. Under expectant treatment, the abscess healed. During the cicatrization, the iris was drawn toward the outer margin of the cornea and the pupil pressed against the inner surface of the cornea. The final result was quantitative perception of light. An iridectomy was performed, and vision after that became 6/12.

In *Ophthalmology*, October, 1910, from the Eye Clinic of Prof. O. Haab, in the University of Zurich, Anton Lutz reports two cases of metastatic abscess of the eye following furunculosis and epidemic meningitis respectively. In the second case, which occurred in a boy of ten years, pus appeared in the inferior temporal quadrant of the sclera of the left eye. Vision was

reduced to perception of light. On the evening of the day of admission, the abscess burst and a quantity of pus escaped, containing *micrococcus pyogenes aureus*. The abscess healed with vision of 6/6.

The foregoing cases and some others showing metastatic irido-choroiditis with rupture into the anterior chamber of the eyeball and panophthalmitis (which, to my mind, are not at all similar to my own case) show the rarity of occurrence of metastatic affections of the eyeball.

The treatment in these cases has been indifferently reported, and I shall accordingly give the treatment of my own case in greater detail.

Case.

The report of my case of metastatic abscess of the episclera is as follows :

Mr. H —, age 53 years, widower, clerk in one of the Government offices, came to me first on June 14th, 1909, in need of refraction. I found some blepharitis, arcus senilis, and angio-sclerosis, and prescribed for him for near work + 3.50 D. Sph., as I found no astigmatism. On August 11th, still troubled with his eyes, he came to me, and I suggested some regular and definite attention to them, because of the angio-sclerosis. I saw him a number of times between August 11th and December 24th. On December 26th, 1909, when he came to the office, he was complaining of a carbuncle on the left side of the neck. This was opened and kept open by enlarging the incision on the 27th. On the 28th he came in with what seemed to be "pink eye" in the right eye. He continued under daily observation. The conjunctiva cleared to a certain extent under the use of 10 per cent. protargol and hot applications. Suddenly, however, an œdema of the ocular conjunctiva presented itself in the lower cul-de-sac and became general throughout the ocular conjunctiva. No underlying swelling could be seen through the transparent chemosis. About January 1st, 1910, an underlying swelling was seen in the lower-outer portion of the episclera, having no inflammatory signs, as of the congestion commonly seen in cases of scleritis and episcleritis, except that there was excruciating pain which had to be controlled by the use of morphine. Vision was normal. There was no iritis. This episcleral swelling increased each day and with it the general chemosis. The orbital tissues became more swollen, and some proptosis occurred. On January 3rd the general swelling had somewhat decreased, as had also the chemosis of the conjunctiva, except in the lower-outer portion towards the cul-de-sac. The episcleral swelling was now seen through the chemotic conjunctiva as a tumour, the size of a large pea, with a yellow cast of colour. The suspicion which had been aroused by this swelling for the past two days was confirmed, namely, that I had to deal with a metastatic abscess of the episcleral tissue. After thorough cocaineization and the introduction of the speculum, a small incision was made in the tumour and pus evacuated, some of it being reserved for microscopic examination. Pain, which had been constant for several days, now subsided, and did not recur. The patient was given an antiseptic wash to use every half hour with an eye cup, and all other local medication was discontinued, except hot applications of sodium chloride solution, which were continued every two hours. Meanwhile, the condition of the neck was so far improved that there was no pus and the wound was healing well.

Dr. Marcus W. Lyon, Professor of Bacteriology of the Medical Department of Howard University, reported that microscopic examination of the pus from the eye showed the *staphylococcus pyogenes aureus*, as did also that from the carbuncle of the neck.

The abscess showed a persistent tendency to heal, so that it was necessary to keep it open by daily probing from January 5th to 12th. On January 12th the outer rim was excised, and the actual cautery used. Two days later it was re-opened and again on January 17th, the eye being turned up and in, an incision, transversing the abscess completely, was made by a Graefe knife, with the back of the knife toward the sclera, the edge of the blade directed down and forward at an angle of about 45° to the eyeball and the point toward the temporal side of the orbit. By this incision the abscess was divided into two portions, upper and lower. It was irrigated and then wiped out with pure tincture of iodine. After that date it was repeatedly opened by probe, syringed, and treated with iodine, until the abscess cavity grew much smaller, the discharge lessened, and the wound entirely healed. The general chemosis disappeared and the eyeball became normal. On March 24th the patient was discharged entirely well and using his old glasses. On June 14th, the patient being again examined for glasses, no astigmatism was found, only a slight increase of hyperopia and presbyopia. Vision at this time with a correcting lens of + 2.5 D. sph. in the right eye for distance was 6/4. Vision for near required + 5.5 D. sph. whereas the left eye required only + 4.5 D. sph.

Remarks.

Some there may be who will differ from me regarding the probability of this abscess being of metastatic origin, but reasoning from the facts, I would think it more than likely to have so originated.

One of the most satisfactory features of the case was its outcome, the eye, with correcting lens, obtaining normal vision. There was no astigmatism and only a small difference in the hyperopia ; another is that the appearance of the eye

is unchanged, there being no noticeable scarring and no contracture of tissues.

The treatment of the case was intensely interesting, as there was no guide, except the application of general surgical principles, to this particular condition. It was of necessity somewhat expectant.

Not the least interesting feature is that a patient can have such an inflammation without loss of vision, even temporary, and without any ophthalmoscopic signs, such as hyperæmia of the retina or floating opacities in the vitreous.

INTERMITTENT WORD-BLINDNESS.

BY

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IN the routine medical examination of children in elementary schools a large number of cases of anomalies of speech present themselves. Most of these are due to defects of a congenital nature involving one or more of the following nerve-centres:—

- (1) The auditory word-centre.
- (2) The visual speech-centre.
- (3) The motor speech-centre.
- (4) The motor writing-centre.

Defects in these centres give rise respectively to the following disorders of speech, or writing:—(1) Word-deafness; (2) Word-blindness; (3) Idioglossia; (4) Agraphia.

Singly, or in combination, these defects produce such backwardness in the psychological development of the child that they are often mistaken for cases of imbecility or of serious mental deficiency.

From the sociological and pedagogic point of view, it is important that such cases should be recognised at an early stage of the child's educational curriculum, in order that special methods of instruction may be applied during the more plastic and receptive period of life. As a matter of fact, many of these children, under appropriate methods of instruction, show a high degree of intellectual capacity: there appears to be a compensatory development of other centres with allied functions. Many of these cases are undoubtedly difficult to recognise in children younger than 7 years of age, for the faculty of speech has wide physiological variations in children of all ages, more especially in children before the second dentition.

The following case of congenital word- and letter-blindness is of extreme interest because the condition is intermittent or recurrent in its manifestations, a peculiarity which I have not found described in other recorded cases. The following are the particulars of the case:—

The patient, T.B.,* is an intelligent boy, 8½ years of age, attending the Infants' Department of a London Elementary School in Battersea. Although the boy is below the normal standard for his age, his teachers tell me this is wholly due to the fact that he cannot learn visual reading. He can learn quite quickly by ear, and has a distinctly good memory for all auditory

*Patient shown before the Section for the Study of Disease in Children, Royal Society of Medicine, January 27th, 1911.

and kinæsthetic impressions; indeed, with the exception of a memory for letters and words, he has quite a good visual memory also.

If one draws him a cup, or a hat, or a dog, no matter how badly or inaccurately, he will recognise the object at once, and say "cup," "hat," or "dog." But if one writes the letters c, u, p, he will not recognise any of them, nor their significance when arranged in that order.

I have tested his ability to recognise separate letters and small groups of letters on four independent occasions, but I have not yet succeeded in eliciting the correct answer for more than one or two letters in the whole alphabet, and those which he described accurately by name were, I believe, only guessed at. I am assured, however, by the head mistress of the Infant Department, by the teacher of his class, and by one of his own sisters who teaches him at home, that at times he not only recognizes all the letters, but can read quite intelligibly. These lucid moments occur perhaps once or twice a week.

The boy has such a good memory for words spoken that it is very difficult to differentiate between a parrot-like repetition of whole pages of his reading book and intelligent reading of the same. I have casually presented a page of his book to him, and asked him to read it aloud. After a few seconds hesitation, he will begin to read, and, as a rule, correctly, but when I have asked him to read particular words or letters out of the page which he has already repeated correctly as a whole, he has been quite unable to do so.

I cannot make out whether he takes in the whole page as a picture, and repeats what he sees, or whether this reading is merely an effort of memory which can be continued after its has once been set in motion by some objective association, such as a familiar picture on the page, or its number.

The boy can read Arabic numerals quite correctly, and is quick at mental arithmetic—in fact, he is able to work out simple sums in addition and multiplication; as a rule, he does the sums in his head, and then writes the result on paper. He can read the time on a clock or watch. His vision seems quite normal.

Although the boy is most ambitious and anxious to learn to read, he has undoubted difficulty in concentrating his attention on any work, in which, for the time being, he is engaged, and this applies particularly to reading.

The whole character of the condition appears to be allied to neurasthenia or psycho-asthenia, and it seems as if, while the constituent neuronic elements of his visual word centre were normal in structure, there is some defect at the synapses, which links up these neurones with the processes of cells in closely associated nerve centres.

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THE ANATOMICAL RELATION BETWEEN THE SPHENOIDAL SINUS AND THE ORBIT. OBSERVATIONS UPON 100 SKULLS.*

BY

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IN a paper read before this Academy in September, 1908, we presented a number of specimens pointing out the anatomical relationship existing

*Read before the American Academy of Ophthalmology and Oto-Laryngology at Cincinnati, Ohio, September 21, 1910.

between the sphenoidal sinus and the optic nerve and commissure. At that time, as well as in a general study of the sphenoidal sinus by Dr. Gibson, presented before the American Medical Association in June of the same year, attention was called to the fact that some of the specimens showed diverticula which approached or invaded the orbital wall, and also that certain definite groupings of the sinus were possible, based upon its position in the body of the sphenoid. These studies stimulated us further to investigate the relationship between the orbit and the sinus, in view of determining in an anatomical way, what, if any, bearing affections of the latter might have upon those structures protected by the former.

The specimens upon which the following observations are made are, in the main, those which were presented in the two papers above-mentioned, together with some new material which has come into our hands since those studies.

These specimens have in large measure been taken at random from the dissecting room of the University of Buffalo, while a few more were obtained from private sources. In collecting the material no attention has been paid to race, sex, previous history. The specimens are "dry"—that is to say, all soft tissues and membranes have been carefully removed, and the bones thoroughly dried. In the above respects, as well as in reference to age and sex, the material of these three papers is uniform.

In making observations upon thickness of the bone separating the orbit and sinus it has seemed best to divide the walls into two classes:—

1. Thin, and 2. Thick.

By *thin* is meant any wall measuring .5 millimeter or less, and by *thick* is meant all walls measuring over .5 millimeter in thickness. While this figure is an arbitrary one it was chosen because readily estimated, and seemed, on the whole, a fair working basis from a clinical standpoint. Where it has been possible to saw without destroying the specimen, actual measurements have been made by means of a carefully graduated steel rule. Otherwise, the thickness of the wall has been judged by its light transmitting qualities, as compared with plates of bone of known thickness. In our experience, the latter method is as trustworthy as the former. As formerly, in cases of doubt, the measurement was *over*-rather than *under*-estimated. Consequently, whatever data are herein presented are conservative. The thinnest portion, for obvious reasons, has always been measured.

In the series of specimens, upon which the following observations are made, the male sex predominates. The skulls are those of adults of various ages, the general average being somewhere near forty-five years. The nationality in most instances is unascertainable.

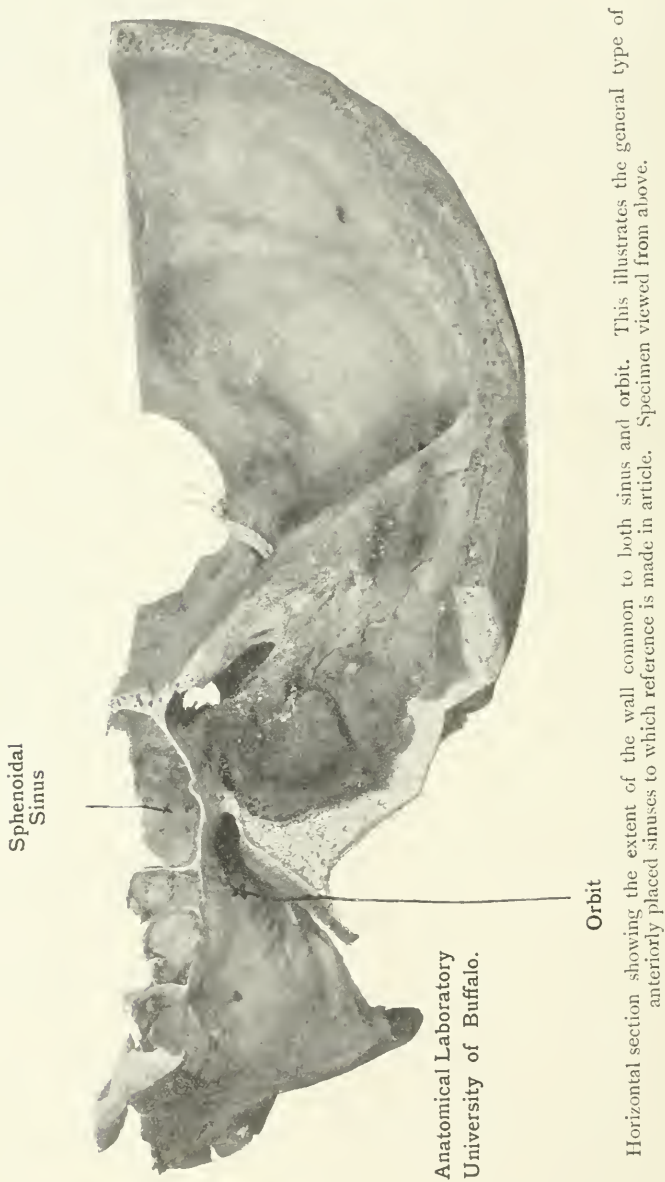
In casting over the material in search for some working basis from which intelligent observation might be made, two anatomical conditions and one problem have presented themselves:—

1. Projection from the sinus of diverticula which approach or even invade the orbital wall.
2. Those types of sphenoidal sinus placed so far forward in the body of the sphenoid that the external wall of the sinus becomes in part the inner lateral wall of the orbit, and
3. What are the possible avenues of communication between the orbit, on the one hand, and the sinus, on the other?

Diverticula.

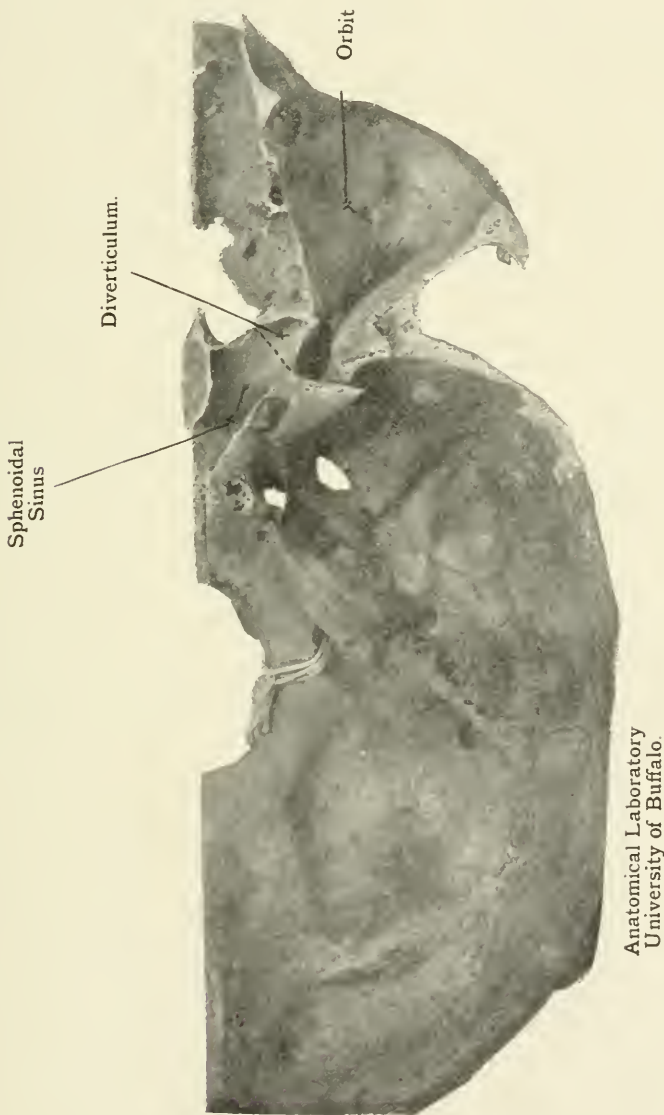
In a trifle over 23 per cent. of the specimens at our command

diverticula of various dimensions were found which approached, or actually invaded, the orbital wall. These range from a comparatively small dimpling in the sinus wall to a very sizeable, cavernous-like prolongation extending



well toward the orbital wall, so that a relatively thin plate of bone separates the orbit from the sinus. Of these 23 specimens, 17 showed diverticula whose walls at the point of contact with the orbit measured .5 millimeter or less in thickness. Estimated in ratio to the entire series, 17 per cent. may be classed

thin according to the basis of our measurements. However, 8 of these specimens also present a common wall with the orbit of such thickness as to be classed by us as *thin*, consequently to avoid repetition in our percentages we have counted only the remaining 9, whose sinus cavity is either not in



Horizontal section sawed through the long axis of a diverticulum, in such a manner as to show how the sinus is brought in relation to the nasal wall of the orbit. The section has been made obliquely through the wall of the diverticulum which accounts for its apparent thickness. Dotted line indicates beginning of diverticulum as distinct from sinus cavity. This illustrates the general type of a diverticulum invading the orbital wall to which reference is made in article. Specimen viewed from above.

contact with the orbit, or whose walls are classed by us as *thick*. Reduced to the basis upon which the classification to follow is computed, this percentage is $4\frac{1}{2}$ per cent.

Your attention in this connection is especially invited to Specimens #7, #R. 22, #24. Upon inspecting these particular specimens more closely

certain mechanical features immediately occur to an observer. Indeed, it seems to us that the most striking one is that of mechanical drainage. A diverticulum such as is seen in Specimen #R. 25, is so placed that in the erect position of the head, it is the lowest level of the sinus, towards which any products of inflammation will naturally gravitate and in which they will collect and remain undrained. In other words, such a diverticulum will readily harbour an accumulation of infective material holding it in close proximity to the orbit and its contents.

Sinuses Having a Wall in Common with the Orbit.

In the papers quoted at the beginning it was shown that as regards position in the sphenoidal bone, sinuses might be grouped into three classes:—

1. Those occupying the entire body.
2. Those occupying the anterior and superior part of the body.
3. Those occupying the central portion of the body.

Besides the above are a very few (4 per cent.) in which the sinus is either totally absent or placed laterally.

Obviously, we are concerned in this study with only groups 1 and 2, namely, those occupying either the entire body or those placed anteriorly. However, over about 60 per cent. of the specimens we have examined come under these headings.

It is quite manifest, that if there be any relationship between sinus disease and secondary orbital affection, the largest factor therein is one of proximity and contiguity, and the index of our work is of necessity based upon the thinness of the wall common to orbit and sinus.

Blood and Lymphatic Supply.

Because of the insurmountable difficulties of satisfactorily injecting specimens, the avenues of communication between the sinus and the orbit have not been made out. Certainly, as far as we are able to determine there are no blood vessels of macroscopic size communicating between the orbit and the sinus. Likewise, nothing is known of the arrangement of the lymphatics. Of necessity, therefore, most notions regarding them are speculative. Without being able to offer any more substantial proof than an opinion unconfirmed, we venture, however, as our own belief, that there may be the same relation existing between the lining membranes of the orbit and the sinus, as exists between the scalp and the meninges, where a thick plate of bone is interposed, and where a definite avenue of infection exists. If there be a way in which infection may travel from sinus to orbit, we think it likely that the veins and lymphatics are the carriers.

In estimating the following percentages we have observed 100 skulls. Of this hundred, 65 have come within the scope of this paper, that is to say, 65 of the skulls have presented either diverticula encroaching upon the orbital wall, or their sphenoidal sinuses have been placed far enough anteriorly in the body of the bone to have a wall in common with part of the orbits, or both.

Of these two groups:—nearly 55 per cent. (54.472 per cent.) have walls .5 millimetre or less in thickness. Computed on the basis of the total number of skulls examined, 33½ per cent. have walls of .5 millimeter or less in thickness.

If our specimens can be taken as indicative of a fair general adult average, one-third of individuals have orbits separated from sphenoidal sinus by a wall .5 millimeter *or less* in thickness. Such an anatomical arrangement immediately suggests the possibility of a morbid process in a sinus of this type becoming an exciting factor in disease of the orbit and its contents. Through the thin wall common to both cavities infection by contiguity is made possible,

Comments.—Although the observations and percentages are upon 100 skulls, really 200 specimens have been examined. As a matter of fact, there is no apparent symmetry between the two sinuses. Because there is a diverticulum on one side, that does not mean that there is a corresponding diverticulum on the other. Indeed, a bilateral diverticulum has but rarely been observed. Also one side may be thick towards the orbit and the other thin.

In our observations account has not been taken nor has anything been said concerning dehiscences. The nature of our material has been such (being "dry") that data under these circumstances are unreliable. The authors feel, however, that dehiscences likely play an important rôle in the living subject.

Conclusion.

A purely anatomical study of this sort carries with it no clinical data, nor can it go further than suggest a more or less vague clinical relationship. However, it may point a way toward an analysis of some obscure orbital trouble, or at least suggest one more factor to be considered as a possible source of orbital inflammation. The authors feel as far as actual possibilities are concerned, they have convinced themselves, at least, that a diseased sphenoidal sinus of the type they have described, or a sinus presenting a large diverticulum encroaching upon the orbital wall, can be, and likely is, a source of menace to the orbital contents with which it is in juxtaposition.

The point which our data most emphasises is this.—About 38 per cent. of normal orbits are separated from their corresponding sphenoidal sinuses by a relatively thin wall. This relation is brought about either by a diverticulum extending from the sinus to the orbit, or by a sinus anteriorly placed in the body of the sphenoid, or by both.

SOME INFLAMMATORY EYE CONDITIONS DUE TO ORAL SEPSIS.*

BY

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In 1883, the late Mr. Henry Power read a paper before the Odontological Society "On the relations between Dental lesions and Diseases of the Eye." In that paper, after referring to earlier observations that had been made in connection with the relation of disease of the teeth and eyes, he went on to discuss the sympathetic nervous relations between the teeth and eyes, using as his text the analogy of sympathetic inflammation of an eye following injury to its fellow. It was then thought that sympathetic ophthalmitis was purely a reflex nervous phenomenon, and on these grounds were discussed paralysis of the various ocular muscles which was in certain cases stated to be due to irritation of the branches of the fifth cranial nerve.

Many diseases of the eye, such as blindness, squint, paralysis of muscles supplied by the third and seventh cranial nerves, and glaucoma have been attributed to disease of the teeth.

There was a long discussion after Mr. Power's communication in which

*A communication read on January 23rd, 1911, before the Odontological Section of the Royal Society of Medicine.

many speakers quoted cases in their own experience, and mention was made, besides the above conditions, of phlyctenular ophthalmia, cataract, conjunctivitis, spasm of the orbicularis, hypermetropia, lacrymation, and others.

Such conditions as these will not be dealt with in this paper. It is with diseases of the eye due to infection either with organisms or their products, and with those cases, especially in which these causes of disease seem to have originated in connection with the teeth, namely, with oral sepsis.

The eye may become infected in two ways—either by a perforating wound, exogenous infection, or by way of the blood stream, endogenous infection.

Panophthalmitis as a result of septicæmia has been long known, and occurs most frequently in septic conditions following labour. It also occurs after surgical operations and in the course of specific infectious diseases. Such cases can be proved in a pathological examination by the discovery of the organism that is the cause of the septicæmia and the same organism in the tissues of the eye that has been diseased.

There are also cases of chronic inflammatory eye disease in which organisms have been found in the retinal and choroidal capillaries, and cases occur of chronic panophthalmitis which resolve without total destruction of the globe. Again, a patient may have one eye attacked by acute panophthalmitis, whereas the other may suffer from a milder inflammation which will resolve without suppuration. In such cases organisms have been found in the inflammatory foci in either eye, but in other cases it is reasonable to suppose that the less damaged eye was injured only by the toxins of the organism which caused suppuration in its fellow.

There are many cases of inflammatory eye disease in which no organism can be found on pathological examination, and it would then seem that the organisms which caused the inflammation have died out, or that the disease was merely due to toxins.

There are several diseases well-known and acknowledged to be the cause of chronic inflammatory eye affections, and passing mention may be made of syphilis, gonorrhoea, and diabetes, each of which will cause a condition in many cases to be distinguished by the clinical picture of the eye affected.

If note be taken of a series of cases of iritis, iridocyclitis, choroiditis, and certain cases in which an exudate is present far forward in the vitreous, it will be found that only a certain, and that a comparatively small, number can be attributed to one of these causes. There is a large number, more especially of inflammation of the iris and ciliary body, due to some other cause or causes and these are the cases which will be dealt with.

Below will be found a series of cases of iritis, iridocyclitis with deposits on the back of the cornea, cases doubtless of cyclitis, with opacities far forward in the vitreous, and of choroiditis.

These cases are not offered as statistics showing the relative incidence of the causes of these diseases. The number is far too small, but they do show what a large number of cases are unexplained.

The cases number in all thirty-nine: 5 of iritis; 21 of irido-cyclitis; 4 of vitreous opacity far forward; 8 of choroiditis; 1 of panophthalmitis.

Of the five cases of iritis, syphilis was responsible for three, gonorrhœa for one, and diabetes for one. Of the twenty-one cases of iridocyclitis, syphilis was responsible for four, one was a case of sympathetic ophthalmia, which leaves sixteen cases for which a cause is to be found. It is this class of case that has been variously labelled "plastic iritis," "rheumatic iritis," and "gouty iritis," and they are the cases most difficult to treat, which marks them out in contrast with iritis and iridocyclitis due to syphilis and the majority of the cases due to gonorrhœa, which respond to treatment well and rapidly.

A search was made for a focus of septic absorption. In one case the focus found was in the tonsils, the patient improving rapidly so soon as these received attention, in spite of more than twelve months' treatment previously which had caused no improvement.

In two cases no cause could be discovered, but in both cases the patients were women, and no actual examination was made of the uterus.

In thirteen cases sepsis in connection with the teeth was present, and although not every case improved as rapidly as one could wish after the teeth were removed, yet in many instances the improvement was so marked as to leave little doubt as to the connection between the oral sepsis and the iridocyclitis.

Here will be mentioned two rather striking cases, especially as one, the first, would certainly seem at first sight to support the opinion that many of these cases are due to rheumatism :

A gentleman, 31 years of age, was seen in consultation with Dr. F. Radcliffe, of Oldham, on April 21st, 1910, and gave me the following history.

Sixteen months previously he was incapacitated from work owing to an effusion into each knee joint. There had been no venereal infection at any time, and his doctor, finding he had a septic condition of his teeth, sent him to a dental surgeon, who removed all his teeth and after a lapse of some months, fitted him with an artificial set. This was done eight months previous to his consulting me. His knees improved a great deal, but yet a considerable amount of fluid remained. About this time also he consulted Mr. Robert Jones, of Liverpool, who diagnosed arthritis due to septic absorption.

The cause of his consulting me was that his right eye had been red and painful for a week. Upon examination, there was intense conjunctival and ciliary injection. There were no deposits on the back of the cornea. The aqueous was hazy. The iris was dull and hyperæmic. The pupil was partially dilated with atropine. No view of the deeper parts could be obtained with the ophthalmoscope, owing to the haziness of the aqueous humour. The tension was normal and the vision 6/12. The left vision was 6/6.

I enquired carefully as to any venereal infection, especially as the effusion into his knee joints was still present, and the simultaneous presence of synovitis, especially of a knee joint, and iritis is strongly suggestive of gonorrhœa as a cause. I also asked about his teeth, and he told me all had been removed eight months previously. I did not ask him to remove his plates to see if any stumps had been left, as he had been under the care of a first-rate dental surgeon.

He was treated in the routine way with atropine and hot bathings.

Three days later, April 23rd, I saw him again. The eye was not so well. The pupil was fairly dilated, but the cornea was becoming hazy. There were no deposits on the back of the cornea. The tension was normal, but the eye was very tender, and he had been in great pain ever since I had seen him before.

He was given a mixture containing fifteen grains of salicylate of soda to each dose to take three times a day.

On April 29th, six days later, I again saw him. The cornea by now was very hazy, and there was a fair amount of infiltration, much as one sees in the early stages of interstitial keratitis in congenital syphilis. The corneal epithelium was irregular and roughened. The pupil was wide, the tension normal, and the pain less.

My notes for May 4th and May 10th are to the effect that the eye remains *in statu quo*. On May 12th he came to my rooms considerably brighter, and told me he had just been to his dental surgeon to complain of a little tenderness in the upper jaw on the right side, and of a bad taste in his mouth, which he

had noticed both before and after the clearance of his mouth ten months previously. He was examined and the septic root of a right upper premolar was found and removed. The patient declared to me that he was already better, although the extraction had been performed but four hours previously.

My notes for May 25th and June 1st state that the eye is much better, and that the cornea has sufficiently cleared to see a large crop of deposits on the back of it.

On June 14th he was very much improved, and there was practically no injection at all. On July last I saw him again, and advised him still to continue with his atropine. On August 4th the vision in the affected eye was 6/5. It should be stated that his knees improved as his eye improved, confirming the diagnosis that the effusion was due to septic absorption, as had been suspected from the early days of his illness. I saw him again on September 19th and October 3rd, when he was perfectly well. I examined him again on January 16th, 1911, and he still continued quite well and his knees are also quite well.

I have quoted this case at some length as it seemed one of considerable interest and afforded a somewhat striking connection between disease and causative agent.

The other case is one of a gentleman of 29 whom I saw on August 2nd, 1909, in consultation with Dr. J. A. Menzies, of Rochdale. He had had iridocyclitis in the right eye for two years and in the left for eighteen months.

When I saw him, his condition was advanced and his eyes were very seriously damaged. The case had been considered one of tuberculous nature. Both eyes were much injected, the pupils extensively bound down, and there were copious deposits on the back of the cornea. In the right eye there was a small yellowish mass below at the angle of the anterior chamber.

He had previously been treated with mercurials, iodide of potassium, salicylate of soda, and also with cocodylate of guaiacol, besides local treatment with atropine. He had benefited but little by these remedies. His teeth were in a very bad state, and he was advised to see his dental surgeon.

He was next seen on August 20th—that is, eighteen days later.

He had had all the septic teeth removed the day after he had been advised to do so, and already reported himself as very much improved. The eyes were certainly very much better, and the small yellowish mass in the right eye had disappeared.

Since then I have not seen him, but Dr. Menzies, of Rochdale, under whose care he is, tells me he is very much improved and that the eyes are now quiet.

Of those cases in which an exudate is seen in the vitreous far forward, the search for a septic focus in the four cases revealed the nose in one instance, in one a recent attack of gastritis, and in two more sepsis in relation to the teeth. As the two cases in which the mouth was at fault are still under treatment, the result of cleansing the mouth cannot yet be ascertained, but these cases are closely allied to iridocyclitis.

Of the eight cases of choroiditis, six were due to syphilis, and in two, no other cause could be found save the septic condition of the teeth.

One case will be mentioned as being of a class not often seen but still distinct clinically.

It is a case in which iridocyclitis was present in the left eye and on further investigation, a mass of exudate was found in the choroid.

The patient was a woman of 40 years of age who had oral sepsis. She was

immediately sent to the dentist, who removed several lower incisors and also some septic stumps. The iridocyclitis quickly disappeared, but the choroiditis resulted in great loss of vision.

Closely allied to these cases of choroiditis is the one case of panophthalmitis in this series. It is a case in which the evidence is very strong in connecting septic conditions of the teeth with ocular disease.

The patient was a woman of 40 years who was admitted to the Oldham Infirmary on April 18th, 1910. She gave the following history.—About ten days previously she had had bad toothache and four days before admission, she had had two teeth extracted after injection of the gum. Twenty-four hours later she became extremely ill and had to go to bed. Twelve hours later on, *i.e.*, thirty-six hours after the extraction, the right eye became red and painful. The pain and redness increased. She was seen on the night of April 19th. Her temperature was 103.2° . She was very ill, and was apparently suffering from septicæmia. The right eye was in a condition of panophthalmitis. So far as could be judged, she had had an extraction in the region of the two left lower premolars. The gum was considerably lacerated and swollen and was in a very foul condition in that neighbourhood, and the odour of the breath was very objectionable.

The nature of the condition was explained to the husband, and the right eye was removed early the following morning. At the operation two drachms of blood were withdrawn from the right median basilic vein for pathological examination.

The patient died the next day at 10 p.m., her temperature before death reaching 107°F . There was no *post-mortem* examination. The blood was sent to the pathological department of the University of Manchester and the eye to the laboratory of Moorfields Eye Hospital for examination.

The report from Manchester showed that the streptococcus pyogenes had been cultivated from the specimen of blood, and Mr. G. Coats of Moorfields reported that the eye showed a typical condition of panophthalmitis, and that by suitable staining processes, streptococci could be seen in the pus and tissues.

If I may sum up what I have attempted to show, it is this.—That from an ophthalmic surgeon's point of view, we have in the mouth a source of infection which, in all probability, is at the root of much mischief that occurs in the eye. Although the number of cases enumerated is small, it is not on these cases alone that conviction rests, but upon a very great number of cases which have come under notice at different times, and which have all been treated on the supposition that the mouth was at fault, in many cases, with marked success.

CLINICAL MEMORANDA.

ON PROTARGOLAGE IN THE TREATMENT OF TRACHOMA.

BY

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THE necessity of treating all cases of trachoma out-door, due to the absence of any accommodation for them in our Infirmary, has led me to the routine employment of protargol.

I have no desire to make strong statements as to the efficacy of the

protargol treatment as compared or contrasted with other methods, but the treatment of this disease is at all times so difficult that any method which promises simplicity with a tolerable degree of efficacy deserves to be emphasised.

As to simplicity, under cocain anæsthesia, the application of protargol, even in the way I shall describe, is practically painless.

As to efficacy, I believe that the method is as successful as many of the more painful methods, taking, that is to say, the general run of cases that are clinically diagnosable as trachoma, and assuming that the cases are treated as out-patients. If it be objected by any one that some of the cases which do well with this treatment are not cases of trachoma at all, but of "follicular" conjunctivitis, I can only say that in the present state of our knowledge one does not feel inclined to dispute the possible validity of that objection. I claim nothing for the method, except that cases which clinically are trachoma, with or without pannus, often do remarkably well.

The method employed is that which has been called *savonnage* or, in the case of protargol, *protargolage*.

After the instillation of cocain, which does not require to be extra strong, the eyelids are everted, and then with a stiffish throat brush—a small camel hair pencil is no use—the conjunctival surface is *firmly* and rapidly brushed with a 20 per cent. solution of freshly prepared protargol until everything is smothered in a soap-like lather. The force used and the duration of the application can, of course, be varied according to the case. The eyeball may be protected with a spatula if thought necessary, especially when treating the *cul-de-sac*.

Brushes are in these days considered objectionable, but I believe the brush is the only applicator which will give rapid soaping of the drug. In order to avoid the expense of a new brush for each application, the patient carries home his own brush after it has been washed in hot water, and brings it with him at the next and subsequent visits.

As to the *rationale* of the treatment, probably the firm brushing with protargol acts in the same way as brushing with other drugs, such as salts of mercury: there is, that is to say, a certain amount of scarification of the surface, and the working in of a chemical substance. But freshly prepared protargol, while possibly less efficacious than stronger applications which demand general anæsthesia, has the immense advantage of being painless, and therefore applicable in any out-patient department by the method above described.

One must not forget the possibility of silver staining. In any case it is not wise to persist too long in any one treatment.

HEADACHE ASSOCIATED WITH DIPLOBACILLARY CONJUNCTIVITIS.

BY

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THE subjective symptoms in Morax-Axenfeld conjunctivitis, even in the acute cases, are reported as slight (Axenfeld).

According to Peters, headache sometimes accompanies this infection, and ceases when the conjunctivitis is relieved. While seeing a large number of these cases, I have been struck with the frequency with which the complaints

are of headache and other symptoms of asthenopia. This was specially noted in those cases of mild infection with but slight objective signs of conjunctivitis, but where the examination of the secretion from the inner canthus showed numerous diplobacilli. Headache, which is more severe following close work, and in the late afternoon and evening, naturally leads us to seek some error of refraction as the cause. In a number of these cases we find no refractive error to account for the symptoms :

H. M., aged 24, who does office work, consulted me, complaining of headaches, which were more severe in the late afternoon and evening. His refraction, examined under cycloplegia, was found to be normal. There was no muscular error and no changes in the fundi. Examination of the conjunctivæ revealed a mild conjunctivitis. Diplobacilli were found in numbers. Two weeks' treatment with the sulphate of zinc gave him complete relief from his symptoms.

M. C., aged 35, a tailor, consulted me about headaches, which troubled him during his evening work. No error of refraction was found to warrant glasses, but there were numerous diplobacilli in the secretion from his mild catarrhal conjunctivitis. The headaches completely disappeared when the conjunctivitis was cured.

These two cases suffice to illustrate a series of cases in adults and children which I have observed. The symptoms in each case, while pointing to an error of refraction, were due to diplobacillary conjunctivitis; at any rate, the cure of the conjunctivitis relieved the symptoms entirely.

THE USE OF SALICYLATE OF POTASH IN CYCLITIS.

BY

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IN a paper published in the April, 1910, issue of *THE OPHTHALMOSCOPE*, I see that Dr. H. Gifford, of Omaha, advises large doses of salicylates in iritis, etc., as well as in sympathetic ophthalmia.

This communication reminds me of a paper I read at the Griqualand West Branch of the British Medical Association at Kimberley in 1890. In this paper I recommended giving 15 to 20 grain doses of salicylic acid, with an equal quantity of bicarbonate of potash, in cases of inflammation of the uveal tract.

I was induced to advise this method of treatment by seeing the good effect following its use in an epidemic which occurred in Kimberley, principally among the kaffirs in the compounds.

In this epidemic, although the larger number of those attacked were kaffirs, some few white people in the neighbourhood of the compounds were also affected. All the patients presented practically the same signs and symptoms: moderate pyrexia, pains in limbs and joints, without swelling, severe aching pain in the eyeballs, the eyes red and congested and tender, especially in the ciliary region, much ciliary congestion, slightly dilated pupil: some had one or two tags of adhesion of iris to lens capsule. In most of the cases the iris was quite free. Opacities in vitreous in all cases; some floating, some fixed; these opacities varied from grey to blackish. In some kaffirs, who were scorbutic, these opacities were distinctly of blood. The tension of the eyeball was in all cases raised. In some of the cases there were dots at the back of cornea, but not in the majority. The vitreous opacities appeared to come early and quickly in the disease. In nearly all the cases both eyes were

affected. I tried in the first two cases hypodermic injection of pilocarpine, but this seemed to do no good. I then gave salicylate of potash which gave relief quickly—the pains in the eyes, joints, and limbs ceasing—and this was followed by rapid absorption of the vitreous opacities.

The two cases treated with pilocarpine injections did not get absorption of the vitreous opacities whilst under my supervision. Those treated with salicylate, on the other hand, lost their vitreous opacities very quickly, and were all absolutely clear before I lost sight of them: so that I can endorse what Dr. Harold Gifford says of the good effects of salicylates in inflammation of the uveal tract.

These cases seem to show that inflammation of the uveal tract may be caused by the same microbes, or their toxins, which cause specific fevers. I think it well to bear this in mind when we meet with cases of inflammation of the uveal tract, *i.e.*, iritis, cyclitis, and opacities in the vitreous, with an absence of the usual causes.

REVIEW.

OCULAR SPOROTRICHOSIS.*

BY

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SPOROTRICHOSIS has been known only since the year 1898, when Schenk published the first case as a particular disease which he connected with the presence in the subcutaneous nodules of a pathogenic fungus, the sporothrix, of which he described a variety since known by his name, the *Sporothrix Schenki*. The case was one of cutaneous sporotrichosis.

The first case of cutaneous sporotrichosis in France was published by de Beurmann in 1903, and, with Matruchot, he described another variety of the parasite, the *Sporothrix Beurmanni*.

Another important work upon the question was published in 1906 by Beurmann and Gougerot, and Dor, *à propos* a new case, bestowed the name "sporotrichosis" upon the malady.

The recognition of ocular sporotrichosis is of more recent date. The first example of an ocular or rather palpebral localisation was published in the year 1907 by Drs. Danlos and Blanc. But it was from the second case, due to Drs. Morax and Carlotti¹ (*Annales d'Oculistique*, juin, 1908) that we may undoubtedly date the opening of this new chapter in ocular pathology. The localisation, again, was palpebral.

In 1909, *à propos* a new case of ocular sporotrichosis, affecting on this occasion the conjunctiva, Dr. Morax² made a general study of the question (*Annales d'Oculistique*, mai, 1909). Two articles dealing with the disease were published in the same number of the *Annales*:—Attilo Fava³, a case of conjunctival and palpebral sporotrichosis; Burnier⁴, a case of disseminated subcutaneous gummatous ulcerated sporotrichosis, with conjunctival localisations.

Finally, in the *Annales* for August, 1910, appeared four new communications dealing with sporotrichosis: Jeanselme and Poulard⁵, Sporotrichosis of the

*Translated from *La Clinique Ophtalmologique*, 10 février, 1911, p. 62.

iris; Morax and Cruchaudeau⁶, Primary sporotrichosis of the conjunctiva; E. Velter⁷, A case of primary orbito-palpebral sporotrichosis; and Attilo Fava⁸, Experimental sporotrichosis of the ocular apparatus of the rabbit.

After this rapid succession of communications dealing with a disease that was unknown but a brief two years ago, it can scarcely be doubted that we shall speedily be in possession of many documents relating to ocular sporotrichosis. But even now, with the material at our disposal, we can establish a symptomatology precise enough to allow us to catalogue as examples of sporotrichosis cases that have been attributed to some other cause.

A few words may be said as to **cutaneous sporotrichosis**, since we often find that affection associated with the ocular variety.

Cutaneous sporotrichosis at first manifests itself under the form of successively appearing crops of nodules. The most recent have the size of a pea, roll under the fingers, are adherent neither to the skin nor to the deeper layers, and simulate the appearance of aberrant lymphatic glands. The older growths are larger, adhere to the skin, and communicate a sensation of fluctuation. The skin at their level is violaceous, thinned, and depressed, and yields, when pricked, an amount of pus greater than palpation would lead one to suppose. The pus is, in reality, an intransparent serosity of yellowish-green colour, holding in suspension many clots, and resembling the discharge from a "cold abscess" of tuberculous origin.

At the same time we may find deeply-seated gummata embracing the diaphyses and really starting from the periosteum (Jeanselme).

When the cutaneous gummata break down, they produce at first a crateriform ulceration, which may later become transformed into a large flattened ulcer, with mammilated base, rectilinear edges not cut perpendicularly, lightly oozing, and painless on pressure. When cicatrisation is completed, there remains for some time a red, violaceous *plaque*.

The foregoing are the appearances which we should expect to find when the disease attacks the skin of the eyelids.

An important symptom of the malady is to be found in the effect it produces upon the lymphatic apparatus. We find the glands painless and mobile, as in syphilis. According to the exact localisation, these enlargements will be discovered in the groins, the axillæ, the neck, or the mastoid regions.

It is a remarkable fact that notwithstanding the extent of the lesions, the general health is nearly always good.

The cases of **ocular sporotrichosis** so far reported have affected the skin of the eyelids, the palpebral conjunctiva, the edge of the orbit, and the iris.

The commonest localisation is upon the eyelids, where the affection may be primary or accompanied by other cutaneous lesions.

The two most typical cases are those of Drs. Morax and Carlotti and of Drs. Thibierge and Gastinel respectively. In the first the palpebral lesions were characterised by an ulceration situated near the free edge at the level of the cilia of the left upper eyelid, as well as by a series of small palpebral gummata, to which succeeded a lymphatic cord and then a very marked preauricular and maxillary adenopathy. The whole extent of the eyelid had a violaceous colouration. The palpebral gummata presented themselves under the guise of small rounded prominences of slightly yellow colouration. They gave the impression of being so many small abscesses in or beneath the skin. According to the patient's statement, the crusts at the level of the free border had appeared about a week after the palpebral nodules (*boutons*).

In the second case, that by Thibierge and Gastinel, the patient was covered with cutaneous ulcerations, involving the head, the trunk, and the extremities. As regards the face, the lesions were localised around the left

eye. On the lower eyelid was an ulceration which, having commenced in the neighbourhood of the outer angle of the eye, had extended to the whole of the eyelid and spread to the root of the nose. It presented the form of a crescent extending to the level of the malar region. This ulceration was extremely superficial and without depression; its edges, surrounded by a slightly rosy zone, were directly continuous with the base without any traces of detachment. The base was strewn with hemispherical prominences, giving to it a papillomatous aspect. The free border of the eyelid was infiltrated, thickened, and not ulcerated, but the cilia had disappeared and there was a slight degree of ectropion. On the upper eyelid were a couple of softened gummata, situated one by the side of the other, representing together a mass the size of a small haricot bean, and having a brownish-red and lightly violaceous hue. The palpebral conjunctiva was reddened in its whole extent.

In these two cases we see the two different aspects that may be assumed by the cutaneous lesions of the eyelid, namely: 1. the intra-dermic, non-ulcerated, gummatous form; and, 2. the ulcerous form, of which the configuration deserves to be remembered.

The diagnosis must be made especially from syphilis and bacillary infection. Clinically, suspicion should be aroused by the sluggish aspect of the lesions or ulcerations, which are surrounded by sound, and, as it were, indifferent, tissues. No thickening or ham-like induration, as in syphilis, no violaceous nibbled-away edges, no large whitish clots, as in tuberculosis.

The evolution alone will speedily eliminate the diagnosis of a suppurating chalazion.

Leprous ulcerations are always secondary to the other cutaneous or visceral manifestations produced by Hansen's bacillus.

Neoplastic ulcerations, especially that form which is described by the name "rodent ulcer" of the eye-lids, or "*cancroïde*," possess a base that is more subject to hæmorrhage. To palpation, the edges of the base are indurated, and markedly thickened.

A certain diagnosis, however, can be based only on laboratory methods, and chiefly on cultures upon media containing sugar or glycerine (Morax).

Sporotrichosis of the conjunctiva cannot be better described than it is by Attilo Fava in the case of his own person. Auto-inoculation in the course of an experiment upon the rabbit.—The author was injecting into the vitreous body of a rabbit a culture of the sporothrix, when, in consequence of a sudden movement of the animal, some of the emulsion was projected into his face and eyes. The following is the account given by the author of his own case.—Incubation of eleven days for the conjunctival lesion of the right eye, and of fifteen days for that of the left eye. The conjunctival changes were characterised by whitish-yellow spots supervening in a zone of the mucous membrane, thickened and infiltrated with some follicles. These spots where the parasite could be readily found by culture) were the seat of slight sensibility. They gave the sensation of a foreign body, and pressure over the eyelid at their level was a little painful. The lesions were accompanied by slight palpebral œdema and conjunctival hyperæmia. The palpebral lesion was characterised by a circumscribed ulcerous folliculitis extending to the first cilium of the upper lid. It was accompanied by œdema, limited to the eyelid, with erythema, and was followed by a little epithelial desquamation. The conjunctival lesions were immediately accompanied by angulo-maxillary and preauricular adenopathy. The conjunctival changes began to undergo modification three days after treatment with iodide was commenced, and improvement was particularly obvious on the seventh day.

A third variety of ocular sporotrichosis is indicated in the case reported by Velter. The case was one of an abscess formed at the level of the outer half of the right lower eyelid, having the evolution of a "cold" abscess or of a rapidly softening syphilitic gumma. When the collection was incised, there escaped a large enough amount of a brownish-yellow, viscous pus, having the aspect of muco-pus, mixed with a little blood.

Exploration with the probe showed that there was a denuded surface of bone at the level of the inferior and external border of the orbit and on the external wall of the orbital cavity, about 2 centimetres in size and in depth. Drainage : moist dressing.

There was a small preauricular adenopathy, hard, free, and not painful.

Cultures showed that the lesion was of the nature of sporotrichosis.

Treatment by iodide was instituted, but the patient could not be followed.

In sum, the foregoing case represented a primary form of sporotrichosis, having its *point de départ* in the wall of orbital cavity. The author has been able to find in literature only two other cases of osteo-periosteal sporotrichosis involving the orbit.

Localisation in the iris has been observed by Drs. Jeanselme and Poulard in a man who was suffering from generalised sporotrichosis affecting not only the skin, but the osteo-periosteum and the articulations as well. The iritis, it is true, showed no particular sign of its pathogeny, but the diagnosis rested upon the experimental proof by cultures and inoculations as to the sporothrix nature of the cutaneous lesions.

Treatment with large doses of iodide had a rapid effect upon the cutaneous lesions and the iritis. The latter, nevertheless, left behind it synechiæ and pupillary exudates.

After all, from this time forward we must think of sporotrichosis in all cases with small abscesses of the conjunctiva or skin of the eyelids, accompanied by adenopathy. The same remark applies equally to certain palpebral periorbital abscesses in connection with a denuded area of the wall of the orbit.

Diagnosis must almost always be made from syphilis and tuberculosis, and the only way to reach certainty is by means of cultures.

Potassium iodide in large doses appears to be the specific medicament for this affection. That leads us to understand how, until the present time, cases of sporotrichosis may have been mistaken for syphilitic lesions.

SYDNEY STEPHENSON.

REFERENCES

- (1) THE OPHTHALMOSCOPE, Vol. VI (1908), p. 973.
 - (2) *Ibidem*, Vol. VII (1909), p. 555.
 - (3) *Ibidem*, Vol. VII (1909), p. 557.
 - (4) *Ibidem*, Vol. VII (1909), p. 558.
 - (5) *Ibidem*, Vol. IX (1911), p. 195.
 - (6) *Ibidem*, Vol. IX (1911), p. 195.
 - (7) *Ibidem*, Vol. IX (1911), p. 196.
 - (8) *Ibidem*, Vol. IX (1911), p. 196.
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TRANSLATION.

A NOTE ON THE METHOD OF INSERTION OF THE FIBRES OF THE ZONULE OF ZINN INTO THE ANTERIOR CAPSULE OF THE CRYSTALLINE LENS.*

BY

DR. EUGENIO AGUILAR.

NAPLES, ITALY.

CONTENTING myself with expressing here the intention of dealing with this subject fully at the earliest opportunity, and of then giving a detailed description of the method of insertion of the fibres of the zonule of Zinn, not only in the human eye, but also in the eyes of animals (the horse, the ox, the dog, the rabbit, the hen, etc.), I shall confine myself on this occasion to giving a brief note to demonstrate the method of insertion into the anterior capsule in man.



x 10 diameters.

In order to complete this observation in the best possible way, I have adopted a *technique*, which is simple but demands very patient and delicate handling, owing to the necessity of isolating the anterior capsule whole, without rupturing its connections with the fibres of the zonule of Zinn.

*Translated from *Archivio di Ottalmologia*, Agosto, 1910, and from *Bollettino della Società di Naturalisti in Napoli*, Vol. XXIV (Serie 2^a, Vol. IV, 1910).

The method adopted is to fix the eye, as soon as possible after death, in Müller's fluid or in formaldehyde, 4 per cent., and to pass it through alcohol, in successive dilutions of 40 per cent., 70 per cent., and 96 per cent., and then to divide the globe into two parts by a transverse equatorial incision.

The anterior half is placed in a vessel of ordinary alcohol, and the vitreous removed with forceps; then, with scissors, the retina, choroid, and sclera are cut away up to the ora serrata; from the remaining fragment, the cornea and sclera are carefully detached, and the iris is very delicately cut away from the anterior part of the ciliary body; this leaves the lens suspended to the ciliary processes by the zonule.

The lens is then fixed by a needle in its posterior surface, and the posterior capsule is divided, at about a millimeter from the equator, all round, by means of a narrow Graefe knife, or a lance needle. Through this large breach the lens fibres are gradually extracted with fine forceps—a proceeding which calls for the greatest patience and dexterity—until only the transparent anterior capsule of the lens is left.

The preparation is then washed and placed in a vessel containing Weigert's stain for the selective colouring of elastic fibres; here it remains twenty-four hours. It is next put into ordinary alcohol, to decolourise the ground tissues, until the preparation gives up no more stain. Lastly, after copious washing in distilled water, the preparation is put up in neutral glycerine; this avoids the passage through alcohol and xylol, which would be required if it were set up in balsam, and thus lessens the risk of rupture and the amount of shrinkage of the fibres.

I have obtained an elegant and rapid colouration of the zonular fibres by using a special iron-haematoxylin, which was proposed, after long experiment, by the distinguished Professor Lieto-Vollaro¹, for staining the cells of the cornea. I call attention to this method because we obtain by it, not only elegant preparations of the zonule of Zinn, but at the same time we stain the cellular elements of the various tissues comprised in the preparation.

Description of the Preparation.

One can see with the naked eye, the circular anterior region of the ciliary body, fringed with the ciliary processes, and in the field bounded thereby a transparent membrane which is the anterior capsule of the lens. Round the edge of this, there is well-marked zone of a red-violet colour, due to the staining of the fibres with Weigert's solution.

When we look at the whole preparation under small magnification, we see a circular zone, in breadth about a quarter of the diameter of the capsule, made up of elegant radiating bundles of fibres. These fibres arise in large numbers from the corona ciliaris, and extend to the capsule where the shorter attach themselves close to the margin, while the longer end by becoming attached about the upper quarter of the radius of the capsule.

Under strong magnification (Zeiss oc: 4 ob: A) it is easy to follow the course of the fibres; we see strong bundles of fibres, varying both in number and length, arising from the ciliary processes and from the depressions contained between them. The shortest end near the edge of the capsule, but send on rather longer fibrils, which go to be inserted lower down. The longer bundles begin to divide and to break up as they pass from the tips of

¹ De Lieto Vollaro.—Di un nuova procedimento di tecnica per la colorazione nucleare e protoplasmatica delle cellule della cornea propria. (A note on a new method of staining the nuclei and protoplasm of the cells of the substantia propria of the cornea.) *Archivio di Ottalmologia*, Anno XVII, 1909-1910, Napoli.

the ciliary processes on to the capsule. We see, at the level of the edge of the capsule, where the shortest fibres have become inserted, the principal bundles break up into two, three, or four fascicles, which spread out at varying angles and insert themselves into the capsule at different heights and in different planes, corresponding to the convexity of the anterior surface of the lens. Finally, near their termination, the zonular fibres spread out and all become inserted into the capsule at almost the same level as is shown in the photograph of the preparation.

To give a more exact idea of the behaviour of one of the bundles of fibres towards the lens, we may compare the bundle to a sable brush with long hairs, cut very obliquely at the end; if we apply this brush to the surface of a convex lens covered with gum, so that the shortest fibres touch the edge of the lens, and then raise the brush, we shall see that the longest fibres are adherent to the paracentral region of the lens and the shortest to the marginal zone; while between these two sets we find the other hairs adhering in order of decreasing length.

This is the method of insertion of the zonular fibres into the crystalline in man and in all the other animals examined. In the non-human preparations (made from the ox, the dog, etc.) this arrangement is the more obvious on account of the greater convexity of the lens.

The human eye excels all the others in the elegant arrangement of the fibres, in their enormous number and in their length, and it may be presumed that this has a definite relation to the accommodative faculty, which is especially developed in the human eye.

HAROLD GRIMSDALE.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—COMPARATIVE ANATOMY OF THE EYE.

- (1) Hess, Carl.—Contributions to our knowledge of the regional variations of the retina and pigment epithelium in vertebrates. (Beiträge zur Kenntnis regionärer Verschiedenheiten der Netzhaut und des Pigmentepithels in der Wirbeltierreihe.) *Arch. f. vergleichende Ophth.*, Bd. I, S. 413, 1910.
- (2) Franz, Victor.—The minute structure of the processus falciformis in the teleostean fishes. (Der feinere Bau des Processus falciformis im Auge der Knochenfische.) *Arch. f. vergleichende Ophth.*, Bd. I, S. 427, 1910.
- (3) de Lieto Vollaro, A.—New contributions to our knowledge of the comparative minute morphology of the cells of the substantia propria of the cornea. (Neue Beiträge zur Kenntnis der feineren vergleichenden Morphologie der Zellen der Cornea propria.) *Arch. f. vergleichende Ophth.*, Bd. I, S. 452, 1910.

(1) **Hess**, of Würzburg, points out that in various animals the structure of the retina and the depth of pigmentation of the pigment epithelium vary considerably in different parts of the eye, and also in different members of the same species. He considers that this point has received insufficient attention in researches on the movements of pigment, and on alterations in the form of the rods and cones under light and dark adaptation. The statements, for instance, that the rods become thicker on illumination, and that the amount of pigment diminishes, should at least be revised, having regard to the fact that a normal regional variation occurs.

In the frog there is a horizontal linear area above the disc in which the rods are longer and thinner, the nuclei of the nuclear layers, especially the outer, more numerous, the pigment more scanty and more mobile under the influence of light. This seems to represent a rudimentary type of macula. Minor variations are also found in the pigment epithelium above and below this area. A similar area, more or less well defined, is found in some fishes, lizards, and birds. In some animals, also, there is an area in which the coloured retinal oil globules are smaller and more numerous in the "macular" area.

Hess distinguishes two types of pigment in the cells of the frog: a stable form with round granules which remains stationary under the influence of light; and a mobile form with needle-shaped granules, which has the power of passing forward among the rods.

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(2) Two structures peculiar to the eye of the fish are described by **Franz**, of Frankfurt, in this communication—the lens muscle, or *Campanula Halleri*, and the falciform process. The lens muscle is, in many fishes, a flat triangular sheet, whose base springs from the posterior aspect of the iris, and whose apex is inserted, in the form of a short tendon, into the ventral equator of the lens; in other fishes it has a more compact structure and a more complex morphology; in all, it is richly vascular and is the chief instrument of accommodation. The falciform process is a raised ridge, bent laterally at an angle of about 45°, which runs in the lower part of the globe from the nerve entrance to the lens muscle. Franz finds that on each side of the falciform process the pigment epithelium turns back on itself, becomes unpigmented for a short space, and then runs into the retina. The structure therefore represents a permanently open fœtal cleft, and the connective tissue of the process is the mesoblast which normally enters the globe in that situation. This is further shown by the continuity of the connective tissue of the choroid with that of the process. Anteriorly, the mesoblast forms a sheath for the lens muscle. Franz finds that the vascular supply is not a single artery, as has been described, but a network of vessels, and that there is no intimate connection with the vitreous. He believes that the falciform process is not, as is generally assumed, homologous with the pecten of birds, and refers to some researches of his own which go to show that the pecten is essentially an epiblastic structure, and derived (with the exception of its vessels) from the retina. Independent confirmation of this assertion would seem to be desirable. It is remarkable that the lens muscle is rudimentary in the cod, while the processus falciformis is well developed.

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(3) **de Lieto Vollaro**, of Naples, continues his researches on the morphology of the corneal corpuscles with a wealth of microscopical detail which renders a brief summary impossible. Moreover, the figures form so essential a part of the contribution that we must refer readers to the original. In general terms, it may be stated that the size, shape, and arrangement of the cells, the type of branching in their processes, the shape of their nuclei, and the structure of their protoplasm, are subject to almost infinite variation, but

that these variations, on the whole, do not group themselves according to any generic or specific biological classification. They are therefore without phylogenetic significance.

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II.—COMPARATIVE PATHOLOGY.

- (1) Fujita, H.—Thread-worms (*Oxyspirura Mansoni*) in the conjunctival sacs of fowls. (Die Fadenwürmer [*Oxyspirura Mansoni*] in den Conjunctivalsäcken der Hühner.) *Arch. f. vergleichende Ophth.*, Bd. I, S. 423, 1910.
- (2) Mohr, Th.—Congenital corneal opacity with anterior synechia, persistence of the pupillary membrane and congenital aphakia in a pig. (Kongenitale Hornhauttrübung mit vorderer Synechie, Persistenz der Pupillarmembran und kongenitaler Aphakie bei einem Schwein.) *Arch. f. vergleichende Ophth.*, Bd. I, S. 444, 1910.
- (3) v. Sicherer, Otto.—Researches on the refraction of the eyes of fresh water fish. (Untersuchungen über die Refraktion der Augen der Süßwasserfische.) *Arch. f. vergleichende Ophth.*, Bd. I, S. 481, 1910.

(1) **Fujita** of Japan, found parasitic thread-worms to be very common in the conjunctival sac of the poultry of Formosa. The worm in question is the *Oxyspirura Mansoni*, first described by Manson in Amoy on the opposite coast of China. It has also been found in Brazil. On an average, from 10 to 12 parasites may be found in each eye, the record being 200. They cause no trouble beyond slight lachrymation. Nothing is known of their life-history or development, and attempts at artificial cultivation have failed. For a full description of their morphological characters, and for a series of pictures, the original should be consulted.

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(2) **Mohr**, of Breslau, reports the case of a pig which was born with dense central opacities in each cornea. It showed no other congenital abnormalities, and the other members of the litter were normal. The opacities were intensely white, and surrounded by a clear rim of cornea, 1.5mm. broad, interrupted above by a band containing vessels, which ran between the sclera and the leucoma; the surface was smooth. Anterior chamber shallow; pupil invisible; tension normal. Under observation the opacities cleared considerably. The left eye was enucleated 116 days after birth, the right three months later.

In both, pathological examination revealed a considerable central area in which the membrane of Descemet was defective and the deeper layers of the corneal stroma were replaced by cellular vascular tissue, with uveal pigment embedded in it. The anterior layers were more normal but contained a few small vessels, and in one eye a certain amount of pigment. The membrane of Bowman was intact in one eye (it is not stated that this was proved by serial sections); in the other it was broken up over an area corresponding to the defect in the membrane of Descemet. In the same area there was a synechia of the iris and pupillary membrane. The ligamentum pectinatum and canal of Schlemm were fairly well developed. In both eyes the lens substance was absent, but pieces of capsule were present behind the iris.

Mohr believes that the extensive cicatrisation and vascularisation of the cornea, and the inclusions of pigment, exclude an origin by pure malformation and prove the former presence of inflammation. He seems to regard the case as being an example of v. Hippel's "internal ulcer of the cornea." It is doubtful, however, if this is a true inflammatory process, and in the present instance the fibrillation of the membrane of Bowman in one eye, the discovery of pigment in the anterior layers of the corneal stroma, and, above all, the evacuation of the lens leaving some capsular remains behind to prove that it had once been *in situ*, would seem to show that an intrauterine perforation had taken place.

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(3) An estimation of the refraction of the fish's eye was first undertaken by Plateau, who worked it out from observations on the enucleated globe, at from 16 to 27 D. of myopia. Hirschberg, using better methods, found slight myopia in the pike. Beer examined one hundred fish partly by retinoscopy, partly by the direct method, and found in most cases a slight hypermetropia, which, however, taking into account the difference between the level of the retina and of the reflecting layer for which alone the observation could be made, corresponding in reality with a slight myopia.

v. Sicherer has examined eighty fresh water fish with results on the whole similar to those of Beer. In a few cases there was a certain amount of anisometropia. Fish which lead a sluggish life in turbid or thickly weeded waters are more myopic than those which swim rapidly, live in clear water, and prey on their neighbours.

Incidentally, a description of the ophthalmoscopic appearances of the fish's eye is given. The fundus may be homogeneous or honeycombed in texture; clear grey, green, green blue, or yellow in colour; the papilla is round or oval, and may be excavated. There may be no central vessels, or only a small twig projecting into the vitreous, or single vessels running right and left, or a coil of vessels from which many branches proceed.

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III.—THE EXPERIMENTAL PRODUCTION OF ABNORMALITIES OF THE EYE.

Stockard, Charles R.—The experimental production of various eye abnormalities and an analysis of the development of the primary parts of the eye. *Arch. f. vergleichende Ophth.*, Bd. I, S. 473, 1910.

By the use of solutions of magnesium, alcohol, chloretone, ether, etc., Stockard, of New York, was able to produce at will various abnormalities in the developing eyes of fishes.

All degrees of cyclopia were obtained, from two eyes slightly closer together than normal to a single perfect eye. The single eye, again, might be smaller than normal, or buried deeply in the head; or the optic vesicle might fail to form, while the lens vesicle developed independently of it; or both the optic and lens vesicles might fail, the creature being completely anophthalmic. The cyclopean eye may be an efficient organ of sight. Cyclopia is usually attributed to a fusion of the two optic vesicles after their formation, but, according to Stockard, this fusion is already prefigured on their first out-growth from the brain. In some instances one optic vesicle proved more resistant than the other, so that varying degrees of unilateral microphthalmos,

up to total anophthalmos, were produced. The author considers that these experiments tend to show the importance of abnormal environment in the causation of abnormalities. They also show that the lens vesicle is capable of originating and developing in total independence of the optic vesicle, and that the size and shape of the lens is not entirely controlled by that of the optic cup. The optic vesicle seems to be capable of stimulating the ectoderm to form a lens vesicle not only in the usual situation, but also in any other region on which it may chance to impinge. Stockard looks upon this formation of the lens vesicle, in response to a stimulus from the optic vesicle, as an important correlated adjustment, ensuring the almost perfect normal accord between the optic cup and the lens.

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IV.—EXPERIMENTAL TRYPANOSOMIASIS OF THE EYE.

Ulbrick.—Primary ocular manifestations caused by the injection of trypanosomes into the vessels of the eye. (*Manifestations oculaires primitives provoquées par injection des trypanosomes dans les vaisseaux de l'œil.*) *Ann. d'Oculistique*, janvier et février, 1910.

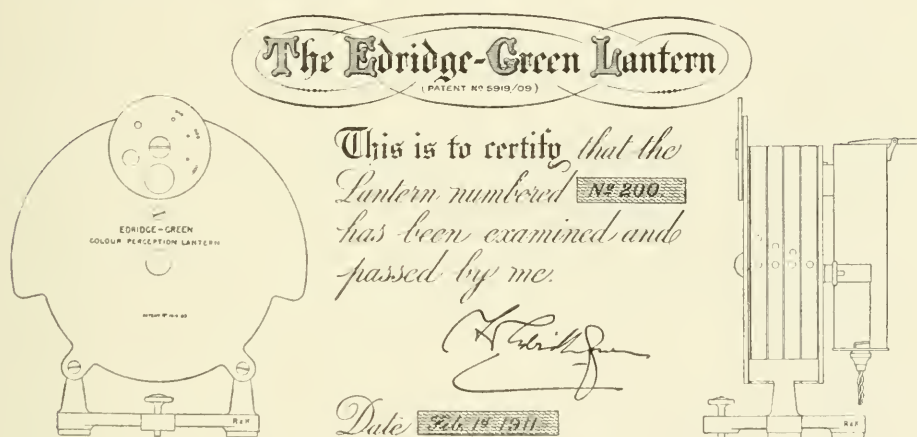
Ulbrick, of Prague working in the Institut Pasteur, has investigated the effects of injecting trypanosomes into the vessels of rabbits' eyes. Owing to the acknowledged resemblance between the animal infections caused by trypanosomes and human syphilis, he hoped that the results obtained would throw some light on the ætiology of syphilitic choroiditis. As it was found impossible to inject doses of trypanosomes sufficient to produce ocular infection into the carotid arteries without causing the death of the animal in a short time, a method was devised by which the small injections were made directly into the *venæ vorticosæ*, and four rabbits were treated with varying doses of blood from mice infected with surra and dourine. The results obtained are summarised as follows.—Injection by the *venæ vorticosæ* is a suitable means of artificially producing hæmatogenous alterations in the eyes when it is desired to use quantities of infectious material which would cause the death of the animal before the appearance of local changes if they were injected into the general circulation. The technical difficulties of the operation in the rabbit, are not great, and it is not dangerous to the eyes. By means of injection of the trypanosomes of surra and dourine into the *venæ vorticosæ* of rabbits, local artificial hæmatogenous inflammations have been produced in the eyes which presented the appearance of grave uveal affections. The principal focus of the inflammation, which was always exudative and accompanied by inflammatory detachment of the retina, was situated in the ciliary body or choroid. Hæmorrhages were frequently present. In one case the posterior layers of the iris were inflamed, while the anterior were only œdematous. The inflammation occurred in the form of foci in relation to the vessels and during its course grave degenerative changes occurred in the retina. There were no corneal lesions, but these might have developed later had the animals not been killed to allow of pathological examination of the eyes.

R. J. COULTER.

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V.—SPOROTRICHOSIS.

- (1) **Jeanselme and Poulard.**—Sporotrichosis of the iris. (Sporotrichose de l'iris.) *Ann. d'Oculistique*, août, 1910.
- (2) **Morax and Cruchadeau.**—Primary sporotrichosis of the conjunctiva. (Sporotrichose conjonctivale primitive.) *Ann. d'Oculistique*, août, 1910.
- (3) **Velter.**—A case of primary orbito-palpebral sporotrichosis. (Un cas de sporotrichose orbito-palpébrale primitive.) *Ann. d'Oculistique*, août, 1910.
- (4) **Fava.**—Experimental sporotrichosis of the ocular apparatus of the rabbit. (Sporotrichose expérimentale de l'appareil oculaire du lapin.) *Ann. d'Oculistique*, août, 1910.
- (5) **Gifford.**—Sporotrichosis of the eyeball and eyelids. *Ophthalmic Record*, November, 1910.
- (6) **Morax.**—Primary sporotrichosis of the lacrymal sac. (Sporotrichose primitive du sac lacrymal.) *Ann. d'Oculistique*, janvier, 1911.
- (7) **Chaillous.**—Primary conjunctival sporotrichosis. (Sporotrichose conjonctivale primitive.) *Ann. d'Oculistique*, janvier, 1911.

Abstracts dealing with sporotrichosis of the eyes were published in Volumes VI and VII of THE OPHTHALMOSCOPE, pp. 973, 554. Those which follow bring the subject up to date.

(1) **Jeanselme and Poulard**, of Paris, record the case of a scavenger, aged 46 years, who was first seen on April 30th, 1910, when he had a typical iritis in his left eye without any irregularity of surface resembling the condition clinically known as gumma of the iris. In addition, he had numerous nodules, varying from the size of a shot to that of a nut, on the skin of his face and body, on the genital organs, and over the front of his left tibia, while his right thigh had been amputated three months previously for what was then regarded as a "white swelling." Cultures of pus from broken-down nodules were taken on five different occasions, and each time a growth was obtained containing a sporothrix differing in certain respects from the known pathogenic members of the group. There was intense sporeglutination. In guinea-pigs inoculation was followed by negative results, thus eliminating tuberculosis, but in white rats it caused lesions characteristic of sporotrichosis. Treatment with large doses of potassium iodide was followed by rapid improvement both of the iritis and the general condition.

The authors consider that although there was no opportunity of proving the presence of the organism in the tissues of the iris, there can be no doubt that their case was one of iritis due to infection with a sporothrix, a condition which has never previously been recorded. They are further of opinion that the supposed "white swelling" for which the right leg was removed, was probably of similar origin.

(2) **Morax and Cruchadeau**, of Paris, record the case of a female patient, aged 22 years, who complained of the usual symptoms of conjunctivitis in her left eye. On examination, the upper lid was found to be normal, but the surface of the conjunctiva of the lower lid was covered with a thin, greyish, grumous secretion, which was very slightly adherent. The lower lid was thickened, and its conjunctiva, which was of a dark-red colour, contained

several circular overlapping areas of unequal size, which were slightly raised and bordered by rings of ulcerated hypertrophied follicles. There was an enlarged preauricular gland. Smear preparations of scrapings from the ulcerated follicles, when examined with the ultra-microscope, gave a negative result, but cultures of similar material yielded a growth of *Sporothrix Beurmanni*. Treatment with potassium iodide was followed by rapid improvement, although the remedy had to be continued for over three months before a cure was obtained.

(3) **Velter's** patient, a man aged 52 years, was treated at the Lariboisière Hospital for a "cold abscess" in the right orbit. This was opened, and, on probing, an area of bare bone was found on the lower and external borders and the external wall of the orbit. Cultures of the pus from the abscess were found to contain *Sporotrichum Beurmanni*. The patient also developed some nodules in the eyelids of the right eye and a painless preauricular adenopathy on the same side, but no lesions which could be attributed to sporotrichosis could be found in any other part of his body, nor could the point of entry of the infection be discovered. The author has been unable to find any other recorded case of primary sporotrichosis starting from the wall of the orbital cavity, but refers to a couple of cases in which such a lesion was secondary to similar lesions elsewhere.*

(4) **Fava**, of Laltarico, Italy, has carried out, at the Institut Pasteur, a series of experiments on the results of inoculation of emulsions of the *Sporotrichum Beurmanni* into various parts of the ocular apparatus of rabbits. He draws the following conclusions:—

Injectations into the subconjunctival tissue cause yellowish characteristic nodules, which ulcerate and resemble the lesions which are met in human beings. Their incubation period varies from 12 to 18 days, and they are not accompanied by adenopathy or general symptoms.

Injectations into the corneal lamellæ cause intra-corneal nodules, which sometimes become vascularised, but which never ulcerate. These spread to the iris by perforating Descemet's membrane, when the parasite can be grown in pure culture from the aqueous humour. The incubation period is from 12 to 14 days.

Injectations into the anterior chamber cause in twelve days nodular lesions of the iris, which last a long time and give rise to inflammatory phenomena in the iris.

Injectations into the vitreous cause serious changes in the deep membranes of the eye and in the vitreous itself, which run a slower course than those produced by injections of other organisms, even when non-pathogenic (*subtilis*, etc.).

In all these cases the organism can be grown from the infected tissue and recognised in smears and sections. In the iridic and corneal lesions it occurs in typical shuttle form, but on the surface of the iris, it takes the form of an entanglement of filaments, which stain with Gram and spread into the superficial layers of the iris. In the vitreous, filaments with rounded bodies on them (spore-bearing mycelium) occur, but no shuttle forms can be found.

R. J. COULTER.

(5) **Gifford**, of Omaha, Nebraska, reports the case of a girl, 18 years of age, who had noticed that her left eye had been getting red for about two months. The eye was slightly irritated and watery, the tarsal conjunctiva and retrotarsal folds were slightly congested, and the ocular conjunctiva presented a somewhat

* Fage.—*Progrès médical*, 23 mai, 1908.

Bonnet.—*Lyon Chirurgical*, 1^{er} avril, 1909.

crescentic thickening, reaching from slightly above the equator at the inner side of the cornea, around below the cornea to a point $\frac{1}{8}$ inch above the horizontal meridian at the outer side of the cornea. At its broadest point below the cornea it was about $\frac{1}{4}$ inch across, but the extremities tapered out somewhat. The thickening was rather smooth and light-red at its broadest point, but at its extremities it was nodulated, with lumps $\frac{1}{16}$ to $\frac{3}{32}$ inch in diameter and presented the general appearance of a retrotarsal fold in a moderately gelatinous trachoma. There was no perceptible swelling of the preauricular or cervical glands, but about an inch from the outer commissure a small lump, about the size of a small pea, could be felt.

One of the conjunctival nodules was yellowish and contained a semi-fluid substance from which cultures were made on serum and agar-agar. These left at room temperature showed, after several days, a scanty but characteristic growth in pure culture of the spirotrichum (Beurmann type). The condition improved under treatment by potassium iodide, but the patient was lost sight of before cure was complete.

Gifford records five other cases of sporotrichosis, but involving the cutaneous part of the lid only, and in three cases the disease seemed to have been related to the lacrymal sac. The diagnosis was not confirmed by demonstration of the sporotrichosis germ. From these observations and the study of the literature of the subject, the author concludes that sporotrichosis of the conjunctiva and eyelids has been observed in three forms.—(1) The dermic or hypodermic granuloma with swelling of the preauricular, sub- or retro-maxillary or cervical glands; sometimes with thickened lymphatic trunks and small granulation abscesses along the line of the lymphatics from the eye to the ear. (2) Yellowish nodules, from the size of a pin head to $\frac{1}{8}$ inch in diameter, in the retrotarsal folds, the semi-lunar fold of the peripheral edge of the tarsal conjunctiva; generally with adenopathy and in one case with ulceration of the lid margin. These subconjunctival nodules contain but little pus and sometimes break down and form ulcers or masses resembling the granulations from a broken chalazion. (3) This class, so far, contains only the author's first case, as it is the sole one in which the ocular conjunctiva has been the seat of the affection. The subjective symptoms were moderate in this as in all the other cases.

J. JAMESON EVANS.

(6) **Morax's** patient had a lacrymal abscess, enlargement of the preauricular and submaxillary glands, and a swelling in the cheek opposite to the third molar tooth, all on the left side.

On incising the abscess, its wall was seen to have a whitish colour, resembling a partially softened gumma. Cultures of pus from the abscess gave growths of *Sporotrichum Beurmanni*, and inoculations of fragments of the abscess wall in guinea-pigs gave negative results. Under treatment with potassium iodide (2 grammes daily, gradually increased to 5 grammes) improvement commenced in a fortnight, and a cure was obtained in five weeks. The author recalls the fact that a similar condition was produced experimentally in the rabbit by Fava.

R. J. COULTER.

(7) **Chaillous** records a case of primary conjunctival sporotrichosis. The patient, a man aged 28 years, was first seen at the Quinze-Vingts on December 9th, 1910, when he complained of discomfort in the right eye with itching, slight discharge, and gumminess of the eyelids in the morning, accompanied by slight, tender, preauricular adenopathy, all the symptoms being of about eight days' duration. On examination, he was found to have slight swelling and drooping of the upper lid, irregular, slightly prominent vegetations scattered over the superior *cul-de-sac*, most of them rather larger than a pin-head, but one the size of a bean, along with shallow erosions, some on the

vegetations and others on the conjunctiva, which was infiltrated, and of a reddish-violet colour. The superior tarsal conjunctiva was thickened and covered with small, slightly prominent, very congested granulations. The yellow spots described by Morax were not present. Later, the patient developed an adenopathy in the upper part of the superficial sterno-mastoid chain on the right side. Inoculations in guinea-pigs gave a negative result, but cultures showed the presence of *Sporotrichum Beurmanni*.

VI.—EMBOLISM OF THE ARTERIAL CIRCLE OF THE CORNEA.

Velhagen.—A case of embolism in the arterial circle of the cornea.
(Ein Fall von Embolie des Randschlingen-Netzes der Hornhaut.)
Centralbl. f. prak. Augenheilk., Dezember, 1910.

An extraordinary case of septic embolism of the scleral vessels is recorded by **Velhagen**, of Chemnitz.—The patient, a man aged 61, became ill in January, 1908, with pharyngitis and tracheitis, accompanied by rigors and fever, and a fortnight later, a left purulent otitis media, which, in spite of paracentesis, led to a mastoiditis, which had to be opened. On the 11th March severe septic cystitis occurred, which in spite of washing out and a permanent catheter, led to pyelonephritis. On the 20th March a double pneumonia of the lower lobes occurred, with swelling of the spleen and severe ulcerative stomatitis. On the 9th April when these conditions had got better, the patient developed photophobia and tenderness of the left eye, and there was found up and out, immediately on the transparent edge of the cornea, a phlyctenular-looking swelling, with a whitish opacity in the deeper layers of the neighbouring cornea. The surrounding conjunctiva and episclera were slightly injected, but otherwise everything was normal. This state of affairs lasted for about a week with only a slight extension of the redness, but it lost its look of a phlyctenule and now looked like a mass of pus going from beneath the conjunctiva into the deeper tissues. On the 18th April, while gently raising the upper lid, this mass came forward slightly, and by slight pressure, was made to come out altogether, leaving in the limbus corneæ a deep punched-out hole, the base of which was black. In the course of the next two or three days, the pupil, which until then had remained quite round, was drawn somewhat towards the wound, leaving it pear-shaped, while the hole gradually filled up and eventually healed completely, leaving the eye quite normal except for the pear-shaped pupil.

The further history of the case was as follows. - On the 27th April he got thrombosis of the left saphenous vein. In July he developed an acute purulent spondylitis in the region of the seventh dorsal vertebra. This vertebra collapsed, causing a small hump and complete spastic paralysis of the legs, the bladder, and the rectum. He was placed in a Glisson's apparatus and the paralysis passed off, and then a plaster of Paris jacket was fitted, which he wore until April, 1909. In October, 1909, the patient was able to resume his work and is now quite well.

The case, therefore, was a chronic sepsis with multiple emboli. The eye condition was undoubtedly caused by such a septic embolism, and that the eye should recover unharmed from such an affection is a very remarkable fact.

A. LEVY.

VII.—INFECTIONS.

- (1) Lutz, Anton.—On some cases of endogenous coccal infection of the eye. (Ueber einige Fälle von endogener Kokken Infection des Auges.) *Klinische Monatsblätter für Augenheilkunde*, Bd. XLVIII, Mai-Juni, 1910.
- (2) James, R. R.—Penetrating injury of the globe with panophthalmitis due to a gas-forming micro-organism. *Ophth. Review*, June, 1910.
- (3) Morax.—On ocular or periocular localisations in the course of staphylococcus infection. (Des localisations oculaires ou périoculaires au cours de la staphylococcie.) *Ann. d'Oculistique*, juillet, 1910.
- (4) Dupuy-Dutemps and Lemarchal.—Metastatic scleritis as the initial manifestation of a general staphylococcal infection. (Sclerite métastatique, manifestation initiale d'une infection générale à staphylocoque.) *Ann. d'Oculistique*, juillet 1910.
- (5) Lutz, A.—On some cases of ectogenous panophthalmitis. (Ueber einige Fälle von ektogener Panophthalmie.) *Klinische Monatsblätter für Augenheilkunde*, Bd. XLVIII, Juli, 1910.
- (6) Terlinck. — Bacteriological observations. *La Clinique (Brussels)*, 10 septembre, 1910.
- (7) Dor, Louis.—Bilateral metastatic panophthalmitis in the course of a suppurative pericholecystitis. *L'Ophthalmologie Provinciale*, novembre, 1910.
- (8) Mauersberg.—Hypopyon-keratitis caused by bacillus pyocyaneus. (Hypopyonkeratitis hervorgerufen durch den Bacillus pyocyaneus.) *Zeitschrift für Augenheilkunde*, Oktober, 1910.

(1) This very instructive paper by Lutz, of Zurich, describes cases in which suppurative processes in the eye arose as metastases from foci in the body.

The first case was in a man suffering from advanced diabetes. A carbuncle on his neck was followed by suppurative irido-cyclitis, which developed into a panophthalmitis and spontaneous perforation. *Micrococcus pyogenes aureus* was obtained in pure culture from the pus, but the blood appeared to be sterile.

The second case was one of massive suppuration in the sclera involving nearly $\frac{1}{5}$ of the globe. This burst externally, leaving an intact retina, and a useful eye. Again, the *micrococcus pyogenes aureus* was found in pure culture, but attempts to cultivate from the blood failed. The primary focus was a boil.

The third case was in a man suffering from epidemic cerebro-spinal meningitis. On the second day of the disease irido-choroiditis set in and was followed by panophthalmitis. There was a peculiar ring-shaped opacity of the cornea.

Finally, a case of conjunctivitis is cited in which there was a single phlyctenule. The *meningococcus intracellularis* was isolated, and the boy, who was not ill, was regarded as a carrier of this micro-organism.

T. HARRISON BUTLER.

(2) James, of London, describes a case of perforation of the globe by a metal dart with a feathery end; within 18 hours panophthalmitis set in and the eye was excised. By culture and inoculation, the causative micro-organism was proved to be the bacillus aerogenes capsulatus. The dart was found lying in the eye; there was no sign of the lens, and the retina was crumpled. The bacillus could be seen in large numbers in the inner layers of the retina with a magnification of 500 diameters.

A. H. PAVAN DAWNAV.

(3) **Morax**, of Paris, points out that although general staphylococcal infection is usually regarded as an acute condition, it often occurs as subacute or even chronic suppuration, and that when its localisation is ocular or peri-ocular, the subacute form predominates. The point of entrance of such infection may be various, among those recorded being wounds of the finger, paronychia, pyelonephritis, and uterine infection from retained placenta. The general symptoms are insignificant, fever being absent or slight.

The ocular localisation may occur as early as the 7th day, and may be the first evidence of general infection. It may be intra-ocular, taking the form of a metastatic choroido-retinitis, or peri-ocular, taking the form of scleritis, Tenonitis, orbital abscess, or orbital periostitis.

The author records a recent case in which the patient had an abscess on the hand, and subsequently developed slowly progressive suppurative peri-ocular inflammation, accompanied by œdema and congestion, which caused proptoses and chemosis. The abscess was opened through the conjunctiva, and the pus from it was found to contain staphylococci. In spite of treatment, the cornea became ulcerated, an abscess formed in it from staphylococcal infection, and, finally, the eye was enucleated.

Examination of the eyeball shewed the remains of the abscess, episcleral congestion, with infiltration of the superficial layers of the sclera and of the fibres of the superior oblique near their insertion, corneal ulceration with deep infiltration amounting to an abscess, a mass of polynuclear cells in the lower quarter of the anterior chamber, infiltration of the iris and anterior part of the vitreous, exudation on the ciliary body, and small groups of polynuclear cells surrounding the retinal vessels.

In discussing the question whether his case should be described as one of Tenonitis, Morax remarks that it is important to recognise that in the greater number of such cases the lesion is not an inflammation of the whole of a structure but a circumscribed inflammatory focus. He insists on the necessity of taking into account all sources of infection, however slight, and notes that the only sign which established the presence of chronic infection was an increase in the number of polynuclears in the blood. He considers that, as far as can be judged from the cases reported up to the present, metastatic staphylococcal infection is essentially characterised by relatively circumscribed suppurative lesions, which can discharge externally or undergo absorption, and that the development of these lesions is a process which can occur insensibly, while their extension can be very slow and limited, several weeks, as a rule, intervening between the first symptoms of ocular localisation and the time when the suppuration perforates or requires to be opened.

R. J. COULTER.

(4) **Dupuy-Dutemps** and **Lemarchal**, of Paris, record a case of episcleritis, which they consider to have been due to staphylococcal infection. The patient, an agricultural labourer, aged 17, with good family and personal history, had a small abscess on the ring finger of his right hand, following an infected wound, and subsequently developed, successively, (1) a patch of episcleritis in his right eye, (2) a prostatic abscess, and (3) a peri-nephritic abscess. The pus from each of the abscesses, and serous fluid from the episcleral nodule, were found to contain staphylococcus aureus. The episcleral nodule became gradually absorbed without suppurating and left a thinned area in the sclerotic.

The authors believe that a large number of cases of episcleritis usually lumped together as rheumatic in origin, are really caused by septicæmia of slight virulence, and that a bacteriological examination of the blood or of the local lesion will sometimes lead to the discovery of the pathogenic agent.

R. J. COULTER.

(5) **Lutz** (Zurich) has examined 13 cases of panophthalmitis bacteriologically at the Zurich *Klinik*. In three cases which are here recorded the exciting organism was anaerobic. The others were less uncommon infections. In seven the *pneumococcus* was responsible. Four of these followed operations, three were accidents—scissors, scratches, and blows. In wounds by splinters the bacteriology was always of a different nature. In two of them no organism could be detected; in the remainder *bacillus subtilis* was the ætiological factor. Subtilis infection was characterised by typical clinical picture, very rapid development of panophthalmitis with relatively slight participation of the surrounding structures, and no rise of temperature or general symptoms.

The three remaining cases were infected with the *bacillus phlegmonis emphysematosæ*, once associated with other bacteria, once in pure culture, and with an obligatory anaerobe which was probably v. Hübner's No. 15 (bacillus causing foul smelling decomposition of albumen), this being a mixed infection with *bacillus subtilis*.

This short paper is worthy of study. In it the author discusses the question as to whether eyes in a state of panophthalmitis should be excised. He thinks that when the infection is pneumococcal or staphylococcal it is better not to enucleate. Subtilis infection should be a fit reason for excision, and the same is true for infection with the bacillus of malignant œdema.

T. HARRISON BUTLER.

(6) **Terlinck**, of Brussels, reports four cases: (1) Infection of the vitreous.—The eye was excised and the pus investigated. Microscopic examination and culture of the original pus and of that obtained after inoculation of the rabbit's vitreous left no doubt that the organism was the *Bacterium putridum* (Flügge) the pathogenicity of which for man has not hitherto been demonstrated. (2) Post-operative benign infection by a micro-organism not hitherto described.—After a cataract extraction a pseudo-membrane appeared about the wound; an iritis of slight intensity resulted. Bacteriological examination showed a large number of thin, short, Gram-negative bacilli, which by their behaviour in culture appeared to be identical with a bacillus studied by Jacque and Masay, at the Pasteur Institute, from pus taken from the meninges, from the pouch of Douglas, etc., and called by them *streptobacterium fatidum*. (3) Conjunctival mixed infection (Morax-Weeks).—The case was one of trachoma. The abundant mucopurulent secretion yielded a mixture of the two organisms. It was a peculiar point that, in a general way, the epithelium cells only contained the Weeks organism, while the pus corpuscles contained either the one or the other but only exceptionally both. (4) Pseudo-membranous diplobacillary conjunctivitis.

ERNEST THOMSON.

(7) The case recorded by **Dor**, of Lyons, is a very remarkable one, albeit wanting in some important particulars. A woman of 61 years was attacked with hepatic colic, and became blind of both eyes in one night from double panophthalmitis. She died on the sixth day in spite of a cholecystectomy performed on the fourth day, in the course of which operation fœtid pus was found in the gall-bladder and in an encysted pericholecystic abscess. Regarding the micro-organism, it is only possible to say that it was not a common one. In the author's words:—"The pus from the eye was inoculated into the peritoneum of a guinea-pig and under the skin of a rabbit. There was neither peritonitis in the guinea-pig nor abscess in the rabbit. In making a direct microscopic examination of the pus, I found an encapsulated bacillus (*Bacillus perfringens?*). Culture tubes remained sterile, but the inoculation was made a little late, the pus having lain two days in a tube before being put into culture. It would have been difficult to make cultures *in vacuo*, but,

having inoculated two animals, I counted on finding the micro-organism by this means and I lost precious time. I cannot therefore say anything except that it was not a common microbe, and that the streptococcus, the pneumococcus, the staphylococcus, and the colon bacillus can be excluded. It is evidently to be regretted that the determination of the micro-organism was not made, for it would be interesting to know what pathogenic agent possesses, as regards the eye, a specificity such that it can simultaneously infect both eyes without causing a local manifestation anywhere else. . . . The exclusive localization to the eye and the simultaneous infection of both eyes, remind one somewhat of the infective panophthalmitis of horses, in which both eyes become affected without any observable initial purulent lesion." ERNEST THOMSON.

(8) The bacillus pyocyaneus is not by any means the harmless saprophyte which it was at one time supposed to be. Cases of general infection and fatal septicæmia have been recorded, and it has often been found to be the cause of a severe suppurative keratitis. It is an ubiquitous micro-organism, and is a frequent inhabitant of the human skin. It has been detected in the axilla and under the breasts, even after the regions have been cleansed with disinfectants.

Mauersberg, of Posen, adds to a list already sufficiently long yet another example of hypopyon-keratitis caused by this organism ending in disorganisation of the globe. The case is described in great detail, and a full account of the bacteriological reactions is given. T. HARRISON BUTLER.

VIII.—THE SCHIÖTZ TONOMETER.

- (1) Marple.—Some observations on the use of the Schiötz tonometer. *Ophthalmic Record*, September, 1910.
- (2) Stock, W.—On the results obtained with Schiötz's tonometer in normal and glaucomatous eyes, especially before and after various tension-lowering operations. (Ueber die mit dem Tonometer von Schiötz gewonnenen Resultate bei normalen und glaukomatösen Augen, besonders vor und nach den verschiedenen druckherabsetzenden Operationen.) *Klin. Monatsbl. f. Augenheilkunde*, Beilageheft, 1910.

(1) Marple, of New York, describes the mechanism and method of use of the Schiötz tonometer (*vide* also THE OPHTHALMOSCOPE, 1910, p. 640). He finds that it is not difficult to use, nor does it take a long time or alarm the patient. As a local anæsthetic, he prefers 2 per cent. cocain drops to 2 per cent. holocain, unless the eye is glaucomatous. He found the readings very accurate and not subject to any considerable variation in the hands of different observers. Schiötz puts the normal tension at from 15.5 to 25 (mm. of Hg.). Marple found it varied from 15 to 24, and regards anything about 25 as suspicious. In the author's observations, 80 out of 94 had tension between 17 and 23, the average of the 94 eyes being 19.5 mm. He has never seen a case of glaucoma where the tension was not above 30, though Stock has recorded a case of chronic simple glaucoma with deep cupping of both nerves, narrow nasal fields, and impaired vision, in which the tension was 22 mm. in one eye and 25 mm. in the other.

Marple found no significant difference between the tension in hyperopic and

myopic eyes. In cases of detached retina the tension was naturally low (13 mm. or so), and was apt to be lower in long standing cases than in recent detachment. In the diagnosis of early glaucoma he found the tonometer of greatest value, and cites two cases. In one case a man of 30 had glaucomatous cupping, contracted field, and reduced vision in the right eye; tension 50 mm. The left eye had normal vision, fundus, and field, but the tension was 33 mm. Pilocarpin reduced the right tension to 37, and three months after iridectomy, it had fallen to 18.

In another case, a female aged 48, there was physiological excavation of the right disc, vision 20/15, and normal field. The left eye showed glaucomatous cupping, contracted field, and vision of 20/20. The tension in each eye was $37\frac{1}{2}$ mm. Characteristic Bjerrum field in each eye.

The tension in glaucoma ranges from 35 to 40 up to 134 in one case of absolute glaucoma. In acute glaucoma the tonometer registered a fall of tension from 65 to 33 after the use of pilocarpin, and from 55 to 26 three weeks after iridectomy for chronic glaucoma. Schiötz reported a case of chronic simple glaucoma in which the tension was reduced from 77 to 36 and kept down for some time by the use of pilocarpin, but after iridectomy, the lowest point to which the tension could be brought was 43, even with the help of pilocarpin.

Low tensions were recorded in a case of cyclitis following extraction (10 mm), and following perforating wound of the ciliary region (12 mm), and in case of cataract with probable detachment of the retina (8 mm). In cases of detachment of the retina in one eye, a low tension in the apparently sound eye would indicate a tendency to detachment at some future date. The effect of things on tension can be very accurately measured and demonstrated by means of the tonometer. In normal eyes the drugs ordinarily used as mydriatics or myotics have no appreciable effect on tension. Neither has cocain, unless there is a tendency to increased tension, and the pupil becomes markedly dilated.

Schiötz found that in a case of aniridia and another in which an iridectomy had been done, the diminution of tension following the use of pilocarpin and eserine was just as marked as in other eyes (with increased tension), which shows that the effect is not wholly due to myosis.

Stock found tension the same in both eyes in a case of unilateral sympathetic paralysis.

Marple considers the greatest value of the tonometer is in determining low degrees of tension and in excluding plus tension.

J. JAMESON EVANS.

(2) **Stock**, of Jena, examined 100 normal eyes with the tonometer of Schiötz, and found values varying from 12 mm. to 26 mm. mercury. This result differs somewhat from Schiötz's datum of 15.5 mm. to 25 mm. as the normal intra-ocular pressure. It follows that values within the limits of the normal may yet indicate a relative hyper-tension; e.g., a tension of 20 mm. may become established in an eye, the natural tension of which was, say, 12 mm. Such a contingency is very rare, Stock recording only one instance: in a woman suffering indubitably from simple glaucoma, a tension of about 20 mm. was found on repeated examination, even after the instillation of homatropine; by sclerectomy it was lowered to 17 mm. Apart from such rare exceptions, the tension in glaucoma simplex is always increased, as was also stated by Meller (*see abstract in THE OPHTHALMOSCOPE*, 1910, p. 370). In one case, with a reading of 70 mm., no hypertension was made out by several examiners through palpation. It would have been very interesting if Stock had compared the results of the two methods throughout his cases. The single discrepancy recorded by him is truly startling.

Stock concludes that Schiötz's tonometer is a trustworthy and most useful instrument, allowing an early diagnosis and early operative treatment of glaucoma. As to the efficacy of the various glaucoma operations, old and new, it appears that in glaucoma simplex Lagrange's operation gives the best results; in very advanced cases a preliminary cyclodialysis may be indicated, this operation alone failing to reduce the tension permanently. In recent inflammatory glaucoma iridectomy is the best operation; the effect and indication of cyclodialysis is the same as in simple glaucoma, this operation being chiefly useful as a preparation for iridectomy or Lagrange's operation. The use of myotics is often necessary afterwards, whatever operation may have been performed.

C. MARKUS.

IX.—FACETTES IN THE CORNEA.

Fuchs, E.—On facettes in the cornea. (Ueber Dellen in der Hornhaut.) von Graefe's *Archiv f. Ophthalmologie*, Bd. LXXVIII, 1 Heft, 17 Januar, 1911.

The condition to which this paper by **Fuchs**, of Vienna, refers is of physiological interest, although of no great clinical importance. It has not yet attracted much notice. We find a shallow, plate-like depression at the corneal margin, sometimes slightly extending beyond the limbus, with clearly-defined but smooth borders, the central one being, as a rule, steeper; its shape is mostly elliptical, with the long axis parallel to the limbus, and its site is mostly on the temporal meridian, very rarely more central. Its depth seems hardly ever to exceed 0.5 mm. Its bottom is often silver-grey and dry, as from xerosis. There is some injection of the corresponding marginal vessels, both limbar and conjunctival. It does not produce any subjective symptoms beyond slight burning, and every trace of it disappears after a few hours or a day or so at the most. The causes producing it are: (1) infiltration of the adjoining conjunctiva and episclera through inflammation (episcleritis, etc.), or from other causes (suffusion, angioma, or even pinguicula), or after operations (muscular advancement) and subconjunctival injections (cocaine, or 10 per cent. saline), (2) instillation of cocaine, (3) operations for cataract, several days after the effect of cocaine has passed off, (4) in a case of idiopathic hemeralopia, (5) in paralytic lagophthalmos, (6) in a few other conditions.

The affection is somewhat akin to the small pits described by Gaule after resection of the trigeminus. They are only seen after the lids are kept apart for a little while, and if the lid action is restored, they disappear at once. Thus it is seen that they differ from the "facettes" by the latter being always marginal and bigger, besides being independent of the lid movements and having a much longer duration.

The anatomical appearance of a "facette" could be studied in a case of excision. The epithelium was reduced to about one-third, the reduction being in the size of the layers without any shedding; there was also thinning of the underlying corneal layers, due to the loss of water. The appearance of the "facette" is very likely due to disturbance of the nerve supply. It must be remembered that the nerves of the cornea are of two kinds: the conjunctival fibres, superficial, without medullary covering, which supply the most peripheral

superficial parts of the cornea only; and the scleral, about 60 small trunks in all which retain their medullary layer till well within the cornea, and lie rather far back at the periphery but gradually ascend to the more superficial strata in their course toward the middle of the cornea. It seems likely that the formation of a "facette" is due to a disturbance affecting one or more of the first group of nerves and remaining confined to the district of its ramification.

R. GRUBER.

X.—FOREIGN BODIES IN EYE OR ORBIT.

- (1) Ridley, N. C.—Foreign bodies in the orbit. *Ophthalmic Review*, July, 1908.
- (2) Piekema, J.—Removal of a piece of copper from the vitreous. (Verwydering van een koper-splinter uit het glasvocht langs operatieven weg.) *Nederlandsch Tijdschrift voor Geneeskunde*, 1908, p. 298.
- (3) Clothier, Jos. V.—Foreign body of the orbit of long standing: report of a case. *Journal of Ophthalmology and Oto-Laryngology*, 1909, Vol. III, p. 88.
- (4) Paderstein, R. —Iron splinter in the clear lens and its treatment. (Eisensplinter in der Linse ohne Starbildung und ihre Behandlung.) *Klin. Monatsbl. f. Augenheilkunde*, Juli, 1910.
- (5) Fejer, J.—A case of cured retrobulbar inflammation caused by a foreign body. (Ein geheilter Fall von—durch Fremdkörper verursachter—retrobulbärer Entzündung.) *Centralbl. f. prak. Augenheilk.*, August, 1910.
- (6) Koerber.—An enormous iron splinter in the eye. (Ein Eisensplinter enormer grösse im Auge.) *Centralbl. f. prak. Augenheilk.*, August, 1910.
- (7) Osolin, J.—A case of eye injury. (Zur Kasuistik der Augen-Verletzungen.) *Centralbl. f. prak. Augenheilk.*, Oktober, 1910.

(1) Ridley, of Leicester, records two cases of foreign body in the orbit: The first was in a groom, aged 39 years, who fell into a standard rose tree and cut his eyelid. As the wound did not heal, he was sent to Ridley five months later, who was able to remove a piece of dead wood, covered with bark, measuring 1 in. \times $\frac{1}{2}$ in. \times $\frac{1}{4}$ in. It was deeply embedded in the orbit.

The second case was in a man, aged 48 years, who was thrown off a bicycle against a bank by the roadside and cut his brow. A doctor stitched up the wound. He was seen by Ridley who nine days later removed a piece of wood from the orbit, $1\frac{1}{2}$ in. long by 2 in. in circumference. It had the appearance of recently broken green wood, and was nearly entirely covered with bark. Lying in the orbit with it was a hawthorn leaf.

Both cases made good recoveries.

C. DEVEREUX MARSHALL.

(2) If a fragment of copper is allowed to remain in the interior of an eye, the latter is generally lost. Therefore, every possible effort ought to be made to extract it as soon as feasible. In Piekema's case a girl had been hit

in the eye by the explosion of a small cartridge. Although the exterior showed hardly anything abnormal, the child was brought to the surgeon. The ophthalmoscope showed a small patch of exudation in the vitreous, in the centre of which something could be seen resembling a foreign body, but which could not clearly be made out. After a few days of observation, during which from lack of certain information as to the nature of the suspicious mass, the author did not feel justified in operating, vision got worse, and it became obvious that an attempt ought to be made to extract the particle. Piekema first made an incision in the sclera, perforated the inner coats of the eye, and inserted a pair of forceps. The eye being well fixed by an assistant, the operator directed his instrument in the interior of the eye with the ophthalmoscope kept in the other hand; then, after a few vain efforts, he was able to catch the mass of exudation and to extract it; a small fragment of copper was found embedded in the centre. The eye did well after the operation. The patient has been under observation for over a year, and she has retained vision enough to walk about alone.

G. F. ROCHAT.

(3) The patient, a man, 23 years of age, gave the history that 16 years ago he got an irregularly shaped piece of copper, 10 mm. long and 5 mm. wide, into his orbit as the result of an explosion. The wound healed, but there was pain over the seat of injury and in the supra-orbital region, the attacks becoming more severe and frequent until the scar inflamed, opened, and discharged a watery fluid. The probe discovered a rough resistant body, and when this was removed by operation, healing was uneventful. Copper by its chemical action on the tissues, can produce inflammation without the intervention of micro-organisms, when it gets into the eyeball, and yet a large piece of copper was in the orbit for sixteen years without its presence being suspected.

HENRY L. G. LEASK.

(4) **Paderstein** describes the case of a man, aged 26 years, in whose lens and iris a piece of iron, about 9 mm. long, had remained for six years without causing cataract. The injured eye had V. 5/20; it showed beginning cyclitis, discolouration of the iris with rust, and a foreign body in the clear lens projecting through the iris into the anterior chamber. The small magnet having failed to dislodge the splinter, the latter was extracted with forceps. Even after this operation, the lens remained clear—at any rate, for several months. The question what to do in a case of an iron splinter in the clear lens is rather perplexing, on account of the following considerations: it is possible that the eye will tolerate the foreign body, and the lens remain clear, any length of time. Extraction would very likely, but not necessarily, produce traumatic cataract. By non-interference, the eye is exposed to certain risks, and the favourable time for extraction may be lost.

C. MARKUS.

(5) The case which **Fejer**, of Budapest, here reports is that of a 13-year old boy who received a blow with a pen handle on the inner side of his right eye. The next day this was seen by a doctor who stitched up the wound. On the following day, the vision became dim, and the lids began to swell; and presently some exophthalmos appeared, and the disc became swollen. The wound was opened up, and pus found deep in the orbit. The orbit was drained, but the boy did not improve, and meningeal symptoms appeared. And so it was decided to remove the eye, in order to attempt to save the child's life. But, just before this was done, a good wash-out of the cavity brought forth a piece of a pen handle, 16 mm. long. The boy promptly recovered. He was finally left with slight exophthalmos, and some diplopia, caused by cicatrices in the region of the internal rectus muscle.

A. LEVY.

(6) **Koerber's** patient was a workman, who without any protecting glasses, was hammering out some bolts, when a piece of the metal entered his eye. This was removed by the magnet, and was found to be half a bolt split



longitudinally. It measured 15 mm. long, the greatest width of the head was 12 mm., and its thickness $5\frac{1}{2}$ mm. Its weight was 3.15 grammes. The eye had to be eviscerated. A. LEVY.

(7) The case which **Osolin** reports is most interesting.—A man, while polishing a piece of iron, suddenly felt a sharp pain in one eye and found the sight diminished. He came to hospital the next day, and then it was seen that a very small and fine piece of metal had entered the eye. One end of this hair-like piece lay in the cornea, its outer end about one third of the thickness of the cornea deep, and its inner end was fixed near the pupillary border of the iris: the lens was not wounded. The piece bent each time the iris moved, and the slightest pressure on the cornea caused it also to bend. The only magnet available was a hand one, and this produced no effect. The question was how to remove it without doing any further damage, and also without breaking it, as it certainly would have broken if a paracentesis had been performed, or an attempt made to seize it with forceps, besides the probability of wounding the lens. It was therefore decided to remove corneal substance down to the outer end of the foreign body. This was done by means of the finest cautery point, and then the end could be seized with forceps and drawn out. The wound healed promptly, and the eye was saved. V. — 5.0 = 0.7. The patient did not know the eye was myopic, and in these circumstances he obtained no compensation. A. LEVY.

XI.—CONGENITAL WORD-BLINDNESS.

Fisher, J. Herbert.—Congenital word-blindness (inability to learn to read). *Trans. Ophth. Society U.K.*, Vol. XXX, fasc. 3, 1910, p. 216.

Fisher, of London, gives details of four cases of congenital word-blindness in children, aged respectively 10, 10, 10, and 7 years, of whom three were males and one a female. Fisher lays stress (as others have done before him) on the several facts that such cases are seldom recognised in hospital work; that the condition is much commoner in boys than in girls; that a family history of alexia is sometimes forthcoming; and that the children who suffer from the defect should receive individual education. In the teaching of reading he advocates the so-called "look and say" method for such children—that is to say, that system whereby the word, or at most the syllable, is made the unit for visual memory instead of the individual letter. A particular apparatus, called "the delightful reading box," to be obtained of Miss Mason, 46, Romola Road, Herne Hill, London, S.E., appears to fulfil the requirements.

Fisher ingeniously suggests (on somewhat slender grounds, as it seems to the reviewer) that cases of congenital word-blindness may be found to range them-

selves into two groups: 1. Those in which there is a failure of development of the visual memory centre for words. 2. Those in which the same centre may have been injured "by a very limited meningeal hæmorrhage during the stress of parturition." In the first group, evidence may, perhaps, be obtained of inheritance or of familial defect. The second group would, of course, be comparable with other cases of "birth palsy." In favour of the existence of such a meningeal group of cases, the author lays stress upon the familiar fact that cases of word-blindness are much commoner in male than in female children, and that meningeal hæmorrhages are twice as common in boys as in girls.

Fisher commences his communication by stating that "in the *Lancet* of May 26th, 1900, Hinshelwood published the first two cases of this condition to be found in English literature." It seems a pity to continue to give currency to this inaccuracy. As the reviewer has pointed out elsewhere (*Reports of the Society for the Study of Disease in Children*, Vol. IV, 1904, p. 165), the condition was first reported by James Kerr in 1896 and by W. Pringle Morgan in the same year. A couple of years later (1898) Dr. Bastian described a case in a young man, aged 18 years. Hinshelwood's cases were not published until the year 1900. At the same time, to Hinshelwood undoubtedly belongs the credit of having been the first writer to describe the condition scientifically, to assign it to a congenital defect in the visual memory centre for words and letters, and to name it "congenital word-blindness."

An interesting discussion followed the reading of Fisher's communication. **F. E. Batten**, of London, mentioned Bastian's earlier communication, and spoke of a well-marked case within his own knowledge. He further thought that the defect was one which involved not the marginal or angular gyrus, as suggested by Fisher, but the commissural system. **E. Treacher Collins**, of London, had seen many instances of congenital word-blindness; and was convinced that the defect might exist in several different degrees. **R. W. Doyme**, of London, believed that the condition did not imply a pathological lesion, and objected to the name "congenital word-blindness," bestowed upon this common condition. The condition, he thought, was due to a deficiency of grey matter in the centre concerned.

SYDNEY J. STEPHENSON.

XII.—DISTURBANCES OF CIRCULATION.

- (1) Whitehead, A. L.—A case of orbital abscess following retinal embolism. *Transactions Ophthalmological Society U.K.*, Fasc. 1, 1909.
- (2) Hansell, Howard F.—A case of temporary monocular amblyopia possibly due to embolus in the optic nerve. *Ophthalmology*, January, 1910.
- (3) Knapp, Arnold.—Intermittent closing of retinal arteries. *Journ. Amer. Med. Association*, June 25th, 1910.
- (4) Harbridge, D. Forest.—Sudden obstruction of the retinal circulation. The reports of two cases, and notes concerning a previously reported case. *Annals of Ophthalmology*, Vol. XIX, July, 1910, p. 448.
- (5) Mathewson, S. H.—Intense thrombosis of the central retinal veins with recovery of normal vision. *Montreal Medical Journal*, August, 1910.

- (6) **Stölting, B.**—Disorders of the retinal circulation in arteriosclerosis. (*Zirkulationsstörungen in der Netzhaut, bei Arteriosklerose.*) *Klin. Monatsbl. f. Augenheilkunde*, September, 1910.
- (7) **Bruns, Henry Dickson.**—A case of spasm of the retinal arteries. *Trans. Amer. Ophthal. Society*, Vol XII, Part 2, 1910.

(1) **Whitehead**, of Leeds, reports the following case.—In the course of an attack of acute rheumatism, one eye of his patient, who was 42 years old, became almost suddenly blind and afterwards congested and painful. Orbital cellulitis followed. There was a soft systolic mitral *bruit*. No focus of suppuration could be found in any part of the body. Pus was evacuated from the orbit, and subsequently the eye was excised. Four days later, the brachial and axillary veins were thrombosed, and an abscess formed, which was evacuated.

In reply to **Parsons**, of London, the author stated that the blood and the pus from the eye were found sterile. In the axillary abscess there were some diplococci. **MacNab**, of London, remarked that many of the cases where there was a localized abscess were pneumococcal, and that, in later stages, the abscesses were sterile. When encapsuled, the pneumococcus rapidly dies out, so that this case being sterile, would probably be pneumococcal.

ERNEST THOMSON.

(2) **Hansell**, of Philadelphia, reports the case of a patient, a woman aged 21, who suddenly noticed partial loss of vision in one eye while sewing. When seen two weeks later, the vision was still obscured, but no abnormality of the eye could be found to account for the defect. The fields of vision were normal. She recovered full sight after five days in hospital, under treatment with mercury and iodide. She was found to be suffering from mitral insufficiency.

The author discusses a number of possible explanations of the occurrence, including hysteria, dropsy of the optic nerve sheath, pressure in the optic canal, hæmorrhage under the sheath or within the nerve, and cerebral lesions. The possibility of "cramp" of the retinal arteries is also discussed. He admits that his diagnosis is based on slender evidence, but comes to the conclusion that an embolus from the heart caused partial and temporary obstruction to the circulation in the central artery of the retina, setting up œdema of the nerve, which was the ultimate cause of the amblyopia.

A. J. BALLANTYNE.

(3) **Arnold Knapp**, of New York, after discussing cramp or spasm (Zehender) of the retinal vessels as the effective cause of sudden blindness, partial or complete, reports five cases where such intermittent closure may actually have taken place. Endarteritis and general arterio-sclerosis existed in all the patients except one, a man aged 32 years. Perusal of the cases, however, makes it evident that the diagnosis of "spasm" was more or less inferential in them all. In most of the patients blindness eventually became permanent, owing presumably to the constricted vessel getting thrombosed.

SYDNEY STEPHENSON.

(4) **Harbridge's** cases were as follows :—

Case I.—This patient, a man, had been under observation since December, 1905. Briefly, there were frequently recurring spasms of the retinal circulation in both eyes, with absolute blindness during the attack covering a period of eleven days, but observed ophthalmoscopically only in the left eye, with restoration and preservation of full vision up to the present time. A moderate amount of retinal arterio-sclerosis in a patient with rheumatic and specific history, with partial loss of patellar and pharyngeal reflexes, partial loss of sexual power, and the subject of vertigo and migraine, which latter, however, almost entirely disappeared.

Case II. A man, aged 63 years. In this case there was obscuration of half the field of vision recurring at frequent intervals during a period of some fourteen months, followed subsequently up to the present by freedom from these attacks, in a patient with a moderate degree of arterio-sclerosis, the subject of weak heart muscle and valvular regurgitation. The patient was myopic. There were fine vitreous opacities. The eyes were of normal tension.

Case III.—A woman, aged 31 years. In this case there was rapidly increasing loss of sight with permanent blindness ensuing, with the premonitory symptoms of misty vision, in a patient with apparently no evidence of arterio-sclerosis, but with unusual changes in the retinal blood current (retina œdematous, cherry-red spot at macula, arteries thin, veins diminished, both contained blood, the vessels, both arteries and veins, were observed gradually to distend and then to subside, the phenomena taking several minutes and were repeated), due to some obstruction, the patient dying with symptoms pointing strongly towards uræmia.

JOHN WHARTON.

(5) A man, aged 38, who had suddenly become almost blind in the right eye, consulted **Mathewson**, of Montreal. There was choked disc to 5D., extreme congestion, and tortuosity of veins. Flame-shaped hæmorrhages in great number. V. reduced to finger counting at 12 feet. Urine normal. Blood count normal. A year later, the eye was found to present normal ophthalmoscopic appearances. V.=6/6.

T. HARRISON BUTLER.

(6) **Stölting** examined the fundus of a patient during a sudden attack of temporary blindness. He saw for a few moments the lower temporal artery of the retina appearing as a white thread. The patient was a man, aged 52 years, who suffered from mitral stenosis; at one time he had had a slight and transient paralysis, with sensory disturbances, on the left side, also redness and pain in both hands and feet (? erythromelalgia). Frequent attacks of failing vision of the left eye occurred during the last two years; the blindness was sometimes complete, sometimes partial, and always of short duration. A year ago a suddenly occurring permanent scotoma in the right eye, to the lower-inner side of the point of fixation, pointed to an embolic process in the right optic nerve. Ophthalmoscopically, the right fundus was quite normal, but the left optic disc was distinctly pale. The left visual field showed a sector-like defect down and inwards. At the last examination L.V. was $\frac{6}{6}$, R.V. $\frac{6}{6}$, while the defect in each visual field was unaltered. **Stölting** accounts for the attacks of failing vision by assuming the presence of a permanent impediment to the retinal circulation (sclerotic changes), on the one hand, and occasional attacks of heart-weakness, on the other. He prefers this explanation to the assumption of spasm of the retinal arteries.

C. MARKUS.

(7) The chief points in the curious case reported by **Bruns**, of New Orleans, are as follows:—

A neurotic girl of 14 years, complained that sight had been failing for two weeks, painlessly and without known cause. V.=fingers at 15 feet. The retinal arteries were found to be extremely small, while the veins were enlarged and dark, and in some places almost of the colour of chocolate. The optic discs were pale, and encircled by a bluish-white halo of œdema. As the author remarks, "the appearance resembled embolism of the central artery, for which, had it been monocular, it might have been mistaken." The patient was left practically without treatment, and sight soon began to improve, especially with the left eye. Twenty months after she was first seen, the sight of each eye was 20/15.

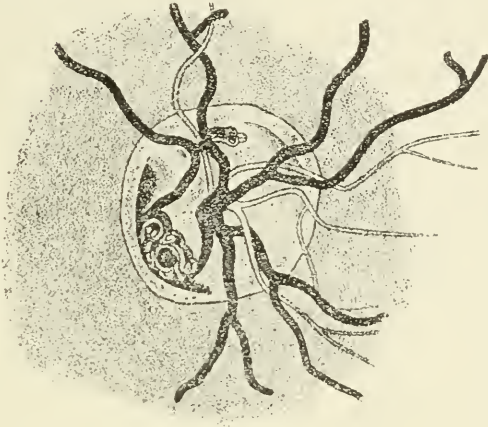
SYDNEY STEPHENSON.

XIII.—CONVOLUTED VESSELS IN SIMPLE GLAUCOMA.

Hönig, A.—Convolutated vessels on the disc in simple glaucoma.
(Gefäß-Schlängelung an der Papille bei Glaucoma Simplex.)
Centralbl. f. prak. Augenheilk., Oktober, 1910.

The obstruction to the outflow of blood from the eye in glaucoma causes the veins to become very full, dilated, and tortuous, and **Hönig**, of Budapest, describes a case where this effect was so much exaggerated as to form a

tortuous complex of vessels on the disc. The maximum effect of such obstruction would be manifested in the eye at the disc, since the pressure in the veins sinks from the capillaries to the heart. The case described was that of a man aged 65, who without any subjective signs, had simple glaucoma. The right disc was excavated almost up to the edge, the arteries were



small, and the veins were much enlarged and tortuous. The upper temporal vein was especially enlarged and showed near its point of termination on the disc, many convolutions and twists, so as to form a definite mass. Of course, this must have taken a very considerable time to form, and the author gives expression to the possibility that this development tended to equalise the pressure inside and outside the eye and cause the disease to run a favourable course.

A. LEVY.

XIV.—TRAUMATIC ENOPHTHALMOS.

- (1) van Schevensteen.—A case of traumatic enophthalmos. (Un cas d'enophtalmos traumatique.) *Ann. d'Oculistique*, décembre, 1909.
- (2) Bourland.—A case of traumatic enophthalmos. (Un cas d'enophtalmos traumatique.) *Ann. d'Oculistique*, mai, 1910.
- (3) Pickler, A.—The clinical picture of traumatic enophthalmus and its pathological anatomy. (Das Krankheitsbild des traumatischen enophthalmus und seine pathologische Anatomie.) *Zeitschrift für Augenheilkunde*, Oktober, 1910, and November, 1910.
- (4) Grönholm.—Contribution to our knowledge of traumatic enophthalmus. (Beitrage zur Kenntniss des Enophthalmus traumaticus.) *Zeitschrift für Augenheilkunde*, Dezember, 1910.

(1) van Schevensteen's patient, a man aged 37, received a blow from a plank which fell from a height of about 5 metres, and struck him on the head, causing loss of consciousness, hæmorrhage from the nose, and a wound of the right fronto-orbital region. When he recovered from the immediate effects of the accident and the dressings were removed, he was found to have in the right eye enophthalmos of about 4 millimetres, limitation of the ocular

movements, with consequent diplopia, contraction of the visual field, and a small zone of hypoaesthesia in the region supplied by the orbital nerve. A series of twenty radiograms (lateral, antero-posterior, and stereoscopic) were taken by Drs. Heilporn and Klynens, which showed an abnormality of the inner wall of the right orbit, probably due to a fracture of the right lateral mass of the ethmoid. The author discusses the various theories which have been put forward to explain the occurrence of enophthalmos, and concurs in the opinion of Birch-Hirschfeld, namely, that the condition is a complex one, and may be due to various causes. He urges the importance of having a series of radiograms of all future cases, but lays stress on the necessity for skill both in taking the pictures and in explaining their meaning.

R. J. COULTER.

(2) **Bourland's** patient, a soldier, aged 29, was wounded on February 18th, 1908, on the left orbital region by a projectile. He did not lose consciousness, and when treated at the ambulance hospital, was found to have two small superficial wounds with bluish oedema of the eyelids, preventing him from opening the eye, and slight diffuse redness of the conjunctiva, which rapidly disappeared. There was no injury of the eyeball, and the vision remained excellent. In three weeks the patient was discharged, having apparently recovered perfectly. A fortnight later the vision of the eye began to fall, and in spite of treatment, did not improve, while seven or eight months after the injury, the eye began to sink into the orbit. When seen by Bourland in December, 1909, there were two white cicatrices, 3 or 4 cm. long, over the left eyebrow, which were neither adherent to the deeper tissues nor tender; the eyelids were normal, and there was no narrowing of the palpebral aperture; the left eye was sunken about 2 or 3 mm. Its movements were slightly diminished, but there was no diplopia, and there was no disorder of sensation in the cornea, lid, or orbital region. The left pupil was somewhat dilated and reacted sluggishly to light, convergence, and accommodation, but well consensually; the right pupil was active to direct stimulation, but inactive consensually. The vision was R. E. 1, and left eye 2/3, not improved by lenses. The left field was slightly contracted and the disc was slightly prominent and hyperæmic with dilated vessels.

The author considers that the enophthalmos in his case was probably due to shrinking of the orbital contents, consecutive to progressive inflammation caused by the injury.

R. J. COULTER.

(3) **Pickler** (Klagenfurt) states that about eighty cases of traumatic enophthalmus have been published and certainly over a dozen hypotheses have been advanced to explain the mechanism of its origin.

In this paper he describes eight more examples, two of which were examined after death. The various theories which have been suggested to account for the phenomenon are discussed in relation to these cases. They present so many varied phases that no single mechanism is applicable to all examples. In a large number there are fractures of the orbital walls which enlarge the space, and so the eye sinks in. This was the case in one of Pickler's patients who died of cancer and came to autopsy. In other examples the muscles may get caught between the displaced bones, as in a case described by Axenfeld. Atrophy of the orbital fat has been described and may sometimes be the predominant factor in the genesis of the deformity. Orbital ischæmia has been invoked to account for the false position of the globe, and Pickler thinks that it explains one or more of his cases. It is supposed to be due to interference with the functions of the sympathetic, and is associated with Horner's syndrome. There is no evidence that paralysis of the orbital muscle which spans the sphenopalatine fissure can cause any degree of enophthalmos.

Although a useful muscle in some of the lower animals, in man it consists of but a few tenuous fibres, too feeble to have any action whatever in moving the eye. During the operation of excising the superior cervical ganglion, the ganglion has been electrically stimulated on at least two occasions, and no movement of the globe was noted.

The paper, although verbose and tedious, is of value to those interested in this somewhat academical question.

T. HARRISON BUTLER.

(4) This paper by **Grönholm**, of Helsingfors, goes over exactly the same ground followed by authors who have recently written on the subject. First, the causes are marshalled; then, the cases are described; next, the literature is analysed; and, finally, we are told that there are several causes, chief among which is fracture of the orbit. Grönholm thinks that the contraction of fibrous tissue in the orbit plays a large part in the causation of the condition. These cases are by no means rare, all are incurable, all have a similar history, and it is generally difficult to decide what is the exact mechanism at work. Neither does it matter much.

T. HARRISON BUTLER.

XV.—OPERATIONS.

- (1) Gifford, H.—The treatment of recurrent pterygium. *Ophthalmic Record*, January, 1909.
- (2) Coover, David H.—A new operative procedure in the treatment of trachoma. *Ophthalmic Record*, February, 1909.
- (3) Alling, A. N.—Transplantation of fat into Tenon's capsule after enucleation. *Ophthalmic Record*, March, 1910.
- (4) Ibershoff (Cleveland, Ohio.)—The use of a mass of fatty tissue as a stump in ocular prosthesis. *Ophthalmic Record*, March, 1910.
- (5) Sweet, William M.—Implantation of a metal ball in Tenon's capsule (the Frost-Lang operation), with report of 48 cases. *Trans. Amer. Ophthal. Society*, Vol. XII, Part II, 1910.
- (6) Kuhnt.—On the cure of organic entropion of the lower lid. (Zur Beseitigung des Entropium organicum am unteren Lide.) *Zeitschrift für Augenheilkunde*, August, 1910.
- (7) Löhlein, Walter.—Technical remarks on my method of transplanting cornea. (Technische Bemerkungen zu meinem Verfahren der Hornhautüberpflanzung.) *Klin. Monatsbl. f. Augenheilkunde*, Oktober, 1910.
- (8) Thompson, Hugh.—The operative treatment of high myopia. *Brit. Med. Journal*, October 29th, 1910.
- (9) Benson, A. H.—A plea for the more extended use of buccal mucous membrane in enlarging certain forms of contracted socket. *Brit. Med. Journal*, October 29th, 1910.
- (10) Rollet, E.—On vascular grafting in order to restore the extirpated lacrymal sac. *Revue général d'Ophtalmologie*, 30 novembre, 1910.
- (11) Herbert, H.—The small flap incision for glaucoma. *Trans. Ophth. Society U.K.*, Vol. XXX, fasc. 3, p. 199, 1910.

(1) **Gifford**, of Omaha, records his experiences with cases of pterygium in which the condition had recurred once or oftener after being operated on by the usual methods, one of his cases having undergone at least seven operative attempts to effect a cure.

He finds that a good result can always be achieved in this distressing class of case by freely dissecting back the growth with the conjunctiva at its base, leaving a large bare space. (It is not definitely stated whether the "head" of the growth is excised or is simply buried.) The sclera is carefully cleaned, and the defect is fitted in either with a large Thiersch flap, half an inch or more in breadth, taken from the skin of the forearm, or by a similar flap of mucous membrane from the inner surface of the lip. A narrow zone of bare sclera, a sixteenth of an inch broad, is left between the graft and the margin of the cornea. In extreme cases the eye may be temporarily maintained in a position of abduction by means of a suture passed through the external rectus and the skin of the outer cauthus, but usually this is unnecessary. If the flap is well applied, there is little danger of its displacement.

The flap invariably grows on to the cornea for about a millimetre, and then stops. Occasionally, it continues to grow, in which case the insertion of a small marginal flap will probably prevent further trouble, but, in general, Gifford finds it more desirable to repeat the whole operation, using a rather larger flap than before.

Gifford finds that a skin flap always retains its epidermal characteristics, and, consequently, that a daily toilet is necessary to remove the loose epithelial cells and adherent dust, etc. On the other hand, the lip flaps have the greater tendency to shrink and do not present quite such an advantageous appearance, as they remain of a redder colour than the rest of the eyeball.

Gifford concludes by observing that slight cases of recurrence may usually be cured by using the narrow circumcorneal graft of Holtz, and mentions that of primary operations the most successful in his hands has been Reynolds', after the performance of which he has found a recurrence in only 2 per cent. of cases.

T. E. ASHDOWN CARR.

(2) **Coover**, of Denver, describes a new method of *grattage* which he uses in cases of trachoma. This consists in rubbing the affected lids with fine sandpaper after the conjunctival sacs have been thoroughly cleansed. A general anæsthetic is used (the author prefers somnoform), and the sandpaper must be pure, *i.e.*, free from glass.

The advantages claimed for this method over ordinary "expression" and the brush method are.—(1) The reaction is practically *nil*. (2) It is applicable to all stages of the disease; the small developing granules, as well as the mature, are removed, and the papillary conjunctiva and even the cicatricial forms are smoothed down; and (3) a vigorous after-treatment with caustic applications is avoided.

T. E. ASHDOWN CARR.

(3) **Alling**, of New Haven, Conn., states that this modification of Frost and Lang's operation was suggested by Barraquer in 1901 and revived by Bartels in 1908. Fat is a low-grade tissue which requires but a limited blood supply to maintain its nutrition and is therefore suitable for the purpose here required. It is generally taken from the abdomen or gluteal region.

(4) **Ibershoff** and **Alling** incise the conjunctiva circumcorneally and pass a suture through the tendon of each rectus before they are divided. After removal of the globe and insertion of a mass of fat about the size of a walnut, these are tied together and Tenon's capsule and the conjunctiva are stitched separately afterwards. There was no apparent decrease in the size of the stump after the lapse of a year.

J. JAMESON EVANS.

(5) **Sweet**, of Philadelphia, has adopted the Frost-Lang operation of

stitching a metal sphere into Tenon's capsule after enucleation of the eyeball in 48 cases, in 42 of which a gold ball was employed for the purpose and in 6 a platinum sphere. The balls varied in diameter from 13mm. to 15mm., the 14mm. size being that found best adapted for adults. In 2 of the cases the metal ball escaped, but an excellent stump was nevertheless obtained. Symptoms of sympathetic irritation, present before operation in 5 of the cases, subsided after operation, and Sweet feels that there is no greater risk of sympathetic ophthalmitis after this procedure than there is after ordinary enucleation of the eye. Should that complication make its appearance, he believes that it would have occurred no matter what operation had been adopted.

Sweet discusses the possible complications of the Frost-Lang operation under the following heads.—1. *Convalescence*.—Most of the patients are able to leave the hospital within a week of the operation, the reaction following which is usually no greater than after simple enucleation. 2. *Escape of the sphere*.—In some of the earlier cases the central portion of the wound failed to unite, with the consequence that the ball became exposed. Under such circumstances healing was usually brought about by repeated touchings with the mitigated silver stick. Restitching of the conjunctiva over the exposed sphere was useless, since the sutures cut out. 3. *Displacement of the ball*.—This complication was observed in none of Sweet's cases. 4. *Sympathetic disease*.—It must be remembered that in the Frost-Lang operation the entire eyeball is removed, so that presumably all structures concerned in the causation of sympathetic disease are absent. Five instances of sympathetic disease subsequent to the operation are on record (Cant, Lang, Suker, Sattler, and Davis). These cases are recounted, and to them the author adds another where what may possibly have been sympathetic irritation followed three years after the performance of the Frost-Lang operation. Finally, it may be mentioned that measurements were made in some of the cases of the amount of movement of the artificial shell, and the average in twelve cases showed rotation upward of 23° , downward of 40° , inward of 21° , and outward of 19° .

SYDNEY STEPHENSON.

(6) **Kuhnt**, of Bonn, thinks that operations suitable to the upper lid should not be transferred to the lower lid without modification. Excision of the tarsus is the best and most certain cure. This can only be carried out when the trachoma has reached its final stage, for until the tarsus has become completely cicatrised, it cannot be separated from the palpebral conjunctiva. Kuhnt incises the conjunctiva 2 mm. from the lid margin, strips off the mucous membrane from the tarsus, divides the tarsus, and then removes it. In earlier cases of trachoma he excises a wedge-shaped piece of tarsus from within, the apex of the wedge being towards the eye. Kuhnt describes this operation as very easy. But many other operations are described as "very easy" which may be and often are extremely difficult, among them may be mentioned trephining the sclera and excision of the lacrymal sac. Our late colleague Cant, of Jerusalem, who has probably performed more trichiasis operations than any other ophthalmologist, is strongly opposed to any procedure which attacks the tarsus from within, for the resulting cicatrisation always tends to undo the result. Cant's modification of Snellen's operation, a much simpler method than Kuhnt's, leaves little to be desired in point of efficiency. We have seen the results of many hundreds of these operations, and regard it as perfectly satisfactory.

T. HARRISON BUTLER.

(7) **Löhlein** uses a fork-shaped instrument which carries small semi-circular knives at the end of the prongs; the latter are 5 mm. or $6\frac{1}{2}$ mm. apart. This double-knife is drawn over the cornea from the upper limbus to the lower, and thus a vertical band of corneal tissue, to be dissected off subsequently, is

delineated. A short conjunctival flap of corresponding width is then formed at the upper limbus, a sharp Græfe's knife is inserted underneath the flap and, with a few rapid movements, is carried downwards cutting through the sclerotic at the limbus and then through the corneal tissue. A similar sclero-conjunctival flap is formed at the lower limbus. Exactly the same operation is carried out on the eye of the individual destined to provide the graft of clear cornea. The latter is stitched to the first eye, the sutures passing through the tags of conjunctiva and the episcleral tissue. In cutting the flaps, the blade of the knife must neither penetrate too deep into the anterior chamber, nor emerge too early, before the completion of the section; the former pitfall is especially to be avoided in the operation on the first eye, the latter in operating on the second eye. C. MARKUS.

(8) This article is an abstract of the full paper published by **H. Thompson**, of London, in the *Ophthalmic Review* for November, 1910. Sixteen dioptries represent the lowest degree of myopia proper for operation. Any age up to 25 may be regarded as suitable. The advance of the myopia is not affected by the operation. The fundus should present no abnormalities beyond a crescent. If one eye is diseased it is wise not to operate, for the chances in favour of the second eye becoming similarly affected are great. A free needling followed by evacuation is recommended. In twenty cases, distant vision was improved in seventeen, three cases proved failures. The second eye should not be touched.

In the discussion which followed, **C. Wray**, of London, thought that the operation seriously increased the risk of blindness. **Hill Griffith**, of Manchester, had operated upon forty to fifty cases, and had not lost an eye. He needled freely, and evacuated by suction. **Gidney's** experience of the procedure was satisfactory. T. HARRISON BUTLER.

(9) **Benson**, of Dublin, has found that the grafting of a piece of mucous membrane from the lip into a contracted socket is a very satisfactory method of treating these difficult cases. The method has been advocated in German publications for the treatment of symblepharon and other cases where contracting fibrous tissue is causing distortion of the conjunctiva. T. HARRISON BUTLER.

(10) **Rollet**, of Lyons, has found that although the majority of cases of extirpation of the sac give no subsequent trouble from lacrymation, there are some patients in whom it would be advantageous to be able to restore the drainage. He has frequently, but always unsuccessfully, tried to pass probes after this operation has been performed. Also, he has tried leaving a small instrument (*petite sonde spéciale à demeure*) in place, to keep an open channel. This has not succeeded either, because the passage closes up as soon as the sound is removed.

In one particular case Rollet has tried grafting a short length of the median cephalic vein of the forearm into the wound at the time of excision of the sac, but the case is too recent to offer an opinion upon. The operation is based upon that of Tanton for the restoration of the urethra by means of a venous graft. ERNEST THOMSON.

(11) **Herbert**, of Nottingham, although satisfied with the results of the "wedge-isolation" operation for glaucoma devised by him some years ago (see THE OPHTHALMOSCOPE, June, 1907, p. 292), recognises that the procedure in question can never attain great popularity, owing to difficulties in *technique*.

Herbert, in the present communication, gives details of the evolution of what he terms the "small flap incision" for glaucoma. One of the encouraging features of this operation, which Herbert recommends for extensive trial, is that there is a fair margin for imperfections in *technique*. Some years ago,

whilst in India, Herbert found that some cases of glaucomatous tension could be relieved by a kind of modified paracentesis. A subconjunctival incision was made with a narrow ($\frac{4}{5}$ mm.) blade through the sclera into the anterior chamber, and, after this, a tiny cut was made at right angles to each end of the primary scleral incision by turning the edge of the knife forward. In this way a small [-shaped flap was cut in the sclera. This operation, with certain modifications, Herbert has repeated since his return to England, and in most of the cases the results have been excellent. By its aid, a permanently filtering linear cicatrix has been obtained. It is to be noted that in some instances the operation takes several months to produce its full effect upon the tension of the eyeball. One point brought out by Herbert's experience is that for eyes with the higher degrees of tension, a very narrow flap may prove insufficient. In his Indian operations the primary scleral incision had a length of from 1.5 mm. to 2 mm., but he now makes incisions which vary in length from 3 mm. to 4 mm. or more. He places these wider flaps above the cornea, since iridectomy may be needed to prevent prolapse or extensive adhesion of the iris. He makes the important observation that adherent iris is less likely to block the whole of the wound when the broad flap is adopted.*

The details of the operation are briefly as follows.—Before operation, physostigmine drops (1 per cent.) are used three times—once on the previous night and twice on the morning. Adrenalin (1:1,000) is applied before cocain is used, once in non-congested, and twice or oftener, if necessary, in congested eyes. The incision is made with a very narrow Graefe knife, which tapers from point to heel, or in operating above the cornea, Sym's iridectomy knife may conveniently be employed. The point of the instrument (whichever be selected) is directed downwards upon the ocular conjunctiva at a point about 4 mm. above the limbus. The conjunctiva, as it were, is pushed down before the instrument. The direction of the knife is then changed, so that its point is made to enter the sclera at a spot 2 mm. to 3 mm. from the limbus. The knife, directed so as barely to escape the iris, is pushed on, and in that way is passed into the anterior chamber. It must be withdrawn slowly. The small vertical lateral cuts in operating above, are made by means of a Taylor's trowel-shaped cataract knife, of which the blade has been ground down to a length of from 5 mm. to 7 mm., the width has been reduced to 1 mm. or less, and the point has been rounded (*see figure*). This instrument is introduced on the flat, its edge is turned forwards at each end of the section, and a small cut is made by sawing movements reaching to the limbus. As the essential is to obtain merely a subconjunctival valve capable, as it were, of some slight swinging movement, the two little incisions may be parallel, or somewhat convergent, or divergent. In order to neutralise the mydriatic effect of the adrenalin and cocain, physostigmine, 1 per cent., should be dropped into the eye twice as soon as the aqueous has ceased to leak freely through the wound. The use of the physostigmine, as a rule, is kept up for two or three days after operation, when, if the anterior chamber has refilled, it is replaced by atropine. Atropine is employed—first, in order to make sure that posterior synechiæ are not forming; and, secondly, in order to increase the leakage through the wound by reducing escape through the normal channels.

SYDNEY STEPHENSON.



*Iridectomy, either button-hole or complete, according to the condition of the iris, is indicated in cases where the pupil does not contract fully to physostigmine beforehand.

REMEDIES.

- (1) Haab, O.—On the causal treatment of eye disease. (Ueber die Kausale Behandlung der Augenleiden.) *Zeitschrift zur Feier des hundert-jährigen Bestandes der Gesellschaft der Ärzte des Kantons Zürich* 1810-1910.
- (2) Bronner, Adolph.—Notes on six cases of suppurative ulceration of the cornea, with hypopyon, treated by local applications of pyocyanase. *Trans. Ophth. Society U.K.*, Vol. XXX, Fasc. 3, p. 226, 1910.
- (3) Eaton.—Device for pneumo-massage of the eye.—*Ophthalmic Record*, July, 1910.
- (4) de Schweinitz, G. E. and Shumway, E. A.—A case of syphilitic iritis (iritis papulosa) treated with a single injection of Ehrlich's "606." Section of Ophthalmology, College of Physicians of Philadelphia. Meeting October 20th, 1910.
- (5) Blake.—Long-continued use of strychnine in toxic amblyopia. *Ophthalmic Record*, November, 1910.
- (6) Denig.—Two cases of interstitial keratitis and one of optic neuritis treated by Ehrlich's "606." *Ophthalmic Record*, December, 1910.
- (7) Dor, Louis.—The treatment of detached retina by tuberculine. (Le traitement du décollement rétinien par la tuberculine.) *Bull. et Mém. de la Société française d'Ophthalmologie*, T. XXVII, 1910, p. 224.
- (8) Darier, A.—Serotherapy in ocular infections. (La sérothérapie dans les infections oculaires.) *Bull. et Mém. de la Société française d'Ophthalmologie*, T. XXVII, 1910, p. 384.
- (9) Fromaget, Camille.—The uselessness of mercurial treatment in the keratitis of heredo-syphilis. (Inutilité du traitement mercuriel dans la kératite hérédo-syphilitique.) *Bull. et Mém. de la Société française d'Ophthalmologie*, T. XXVII, 1910, p. 413.
- (10) Houdart. — Intra-venous injections. (Les injections intra-veineuses.) *Bull. et Mém. de la Société française d'Ophthalmologie*, T. XXVII, 1910, p. 425.
- (11) Thilliez.—The treatment by fibrolysine of profuse hæmorrhage into the vitreous body. (Traitement des hémorragies profuses du corps vitré par la fibrolysine.) *Bull. et Mém. de la Société française d'Ophthalmologie*, T. XXVII, 1910, p. 529.
- (12) Bellencontre, E.—Subconjunctival injections of gelatinized physiological serum in the treatment of congestive hyalitis, vitreous hæmorrhages, and detachments of the retina. (Les injections sous-conjonctivales de sérum physiologique gélatineux dans les hyalites congestives, les hémorragies du vitré, et les décollements rétinien.) *Bull. et Mém. de la Société française d'Ophthalmologie*, T. XXVII, 1910, p. 542.
- (13) Cabannes, C.—Diphtherial paralysis of the external recti: injection of antidiphtheritic serum: rapid cure. (Paralysie diphtérique des deux droits externes: injection de sérum antidiphtérique: guérison rapide.) *Bull. et Mém. de la Société française d'Ophthalmologie*, T. XXVII, 1910, p. 585.

- (14) **Skrainka**.—Chemotherapy in diseases of the eye. *American Journal of Ophthalmology*, December, 1910.
- (15) **Allan, J.**—Aspirin in rheumatic iritis. *Clinical Excerpts*, January-February, 1911.
- (16) **Harry, Philip A.**—The treatment of ophthalmia neonatorum. *Clinical Excerpts*, January-February, 1911.
- (17) **de Lapersonne and Lévi, André.**—"606" and diseases of the eye. (Le "606" et les maladies des yeux.) *Archives d'Ophthalmologie*, janvier, 1911.

(1) In this address, **Haab**, of Zürich, shows how the treatment of eye disease is becoming more prophylactic and causal and less symptomatic. In consequence, such conditions as adherent leucoma and staphyloma are becoming much rarer than they were. The Wassermann reaction marks a tremendous advance in diagnosis, and enables a rational therapy to be adopted. The diagnosis of tuberculous disease has been simplified by von Pirquet and Koch, and we find that tuberculo-toxæmia and tuberculosis play a most important part in the ætiology of ocular disease. The care of strumous children is a most important duty, and at least a quarter of the beds in an eye hospital should be reserved for such cases. T. HARRISON BUTLER.

(2) This communication by **Bronner**, of Bradford, has already been noticed in the columns of THE OPHTHALMOSCOPE (1910, p. 468).

(3) This device by **Eaton**, of Portland, Oregon, consists of a hard rubber Siegel's otoscope, the top lens of which is screwed off and replaced by a double piece of dentist's rubber dam, which is tied in place, and then a hole cut out with scissors, leaving a margin of about one-eighth of an inch. This is placed over the eye, its edge fitting closely over the anterior half of the globe, and the tube of the otoscope connected with the ordinary pump ear-masseur run by motor or compressed air. The forefinger closes the auditory end of the otoscope, and serves to gauge the amount of suction and repulsion.

J. JAMESON EVANS.

(4) **de Schweinitz** and **E. A. Shumway**, of Philadelphia, recorded the history of a patient from the former's wards in the Philadelphia General Hospital who had been admitted on September 17th for the treatment of specific iritis, the initial infection having occurred in August of the same year. The patient had had no constitutional treatment prior to the development of the iritis, and after its appearance, only six inunctions of mercury and less than sixty grains of iodide of potassium. The lesions consisted of a marked thickening of the upper and outer quadrant of the iris beneath which a yellowish papular mass developed, the point of which protruded on the margin of the iris. Down and in there had been an attachment of the iris which had broken loose. Upon the posterior surface of the cornea were numerous precipitates. A single injection of preparation "606" was given, with the kind assistance of Dr. Funk, on October 10th. A Wassermann test made five days previously by Dr. Laird was most actively positive. Marked pain and discomfort followed for about fourteen hours, after which there was no disquietude of any kind. Although there had been improvement in the eye prior to the use of the injection, the rapidity with which the lesions disappeared after its use was most striking. Improvement was noted in forty-eight hours, and by the end of ten days the eye was not far from normal. A Wassermann reaction made nine days after the injection was medium positive.

Holloway, of Philadelphia, stated that he had seen the patient under discussion prior to the injection, and had again seen him yesterday, at which time the iris was practically flat and the eye quiet, and he regarded the prompt and decided improvement as most unusual. The tendency of the profession to look for ill effects following the use of this preparation was doubtless influenced by the unfortunate results that had followed the use of atoxyl in some cases. Owing to this, clinicians have insisted upon an ophthalmoscopic examination prior to its employment. He called attention to the recent series of cases reported by Spiethoff, where, in some cases, transitory blindness and scotomata had followed the injections. Acting upon the suggestion of Murphy, as recently expressed in the *Journal of the American Medical Association*, he had employed sodium cacodylate in a case of uveitis. This patient had a transitory glycosuria, but no other symptoms of diabetes; had given a mild Wassermann reaction; and despite the most vigorous treatment the condition had gradually progressed. The patient had now been on sodium cacodylate for a period of two weeks without the slightest evidence of any improvement. In this case the drug was given by the mouth.

Hansell, of Philadelphia, thought that the profession, if one might judge from the reports in the medical journals, was most enthusiastic concerning the value of "606" in the treatment of syphilis. Rapid cures of inflammation of the various parts of the eye had been described. His experience was limited to a single case of iridocyclitis. Recovery was not particularly prompt or startling, at least not more so than he had often seen following the administration of older and more familiar remedies. The patient was now in the eye ward of the Jefferson Hospital. Wassermann's reaction was positive. He received an injection in the back given by Dr. Olsho, and no other general medication. After one week the symptoms of iritis had improved and the ciliary injection was not as marked. The synechiæ were unchanged. If "606" will destroy the spirochetæ, and mercury and iodides cause the absorption of the exudates, it would seem that a combination would be more effective than either alone.

(5) **Blake's** patient was a telegraph operator, 38 years of age, who had noticed failure of vision for a year. Apart from temporal pallor of the discs, the eyes appeared normal. V.=counting fingers at eight to ten feet. Central scotoma for white and colours. He was a heavy smoker, and had been taking, on an average, eight to ten glasses of whisky a day for the preceding four years.

The advice to stop alcohol and tobacco was complied with, and strychnine sulphate, gr. $\frac{1}{30}$ t.i.d., was ordered. Vision rose to 20/200 during the first week and remained so for six weeks, and then he was given injections of strychnine (gr. $\frac{1}{30}$) into the temples twice a week; six tablets daily by the mouth, and for a short time only, potass. iodid., grs. 10 t.i.d. Vision improved gradually under treatment by injections, and the vision at the end of about two years was 20/15 in each eye. Colour perception improved greatly, so that the patient was only confused by the less common shades and colours.

J. JAMESON EVANS.

(6) **Denig**, of New York, reports two cases of interstitial keratitis presenting typical signs and symptoms, with marked blepharospasm. Two days after injection of "606," the patients were able to open their eyes freely, and the inflammatory symptoms had nearly all disappeared, although naturally the corneal infiltration only diminished very gradually. Wassermann reaction was still positive one month after the injection.

The third case was one of double optic neuritis (papillœdema), with haze of vitreous, in a man aged 34 years, who had suffered from severe secondary and

tertiary syphilis, which was refractory to mercury and iodides. Eleven days after injection with "606" the haziness of the vitreous had disappeared, the swelling of the discs was less and dilatation of the retinal vessels much less marked, and vision had so improved that he could read his newspaper again. A month after the injection the discs were still a little hyperæmic, and the vessels were not quite normal, but the swelling was much reduced and his general condition had improved marvellously.

The writer reviews some of the literature on "606." In most cases it seems to have acted quickly and well, although in some cases of interstitial keratitis the corneal process had not been influenced by it. The author thinks that possibly the cases with marked vascularization react more quickly, and that preliminary mercurial treatment may pave the way to rapid recovery.

In a number of cases, the injections have had to be repeated, and larger doses given. "It seems that '606' involves more danger for the patients than mercury in consideration of its very poisonous character, and it seems to lose its powerful action." "606" also seems to exercise a toxic action on the nervous system, producing symptoms like those observed in acute arsenical poisoning. Some patients have died after the injection; others have become comatose: in some of these accidents there was no lesion of the nervous system; in others it was diseased. In a few cases of spinal syphilis, the disease became much worse, and it would seem that severe cases of syphilis of the nervous system should not be injected. "606" should therefore not be used indiscriminately. It should be employed when mercury is of no avail, or when there exists an idiosyncrasy against it, or in cases where much depends on getting, if possible, an immediate result.

Neisser recommends mercurial inunctions after the injection of "606," and, then, a final injection to kill off all spirochætæ. Denig also suggests that mercurial inunctions should be used for about four weeks before the injection is given.

J. JAMESON EVANS.

(7) **Louis Dor**, of Lyons, enquires whether detachment of the retina may not form in certain cases the sole and solitary manifestation of tubercle acting upon the vitreous body. At all events, during the last two years, on this hypothesis, he has treated five cases of retinal detachment by means of tuberculine, and has obtained in three of them complete and persistent re-attachment, in one re-attachment followed by recurrence, and in one no therapeutic effect. It is to be noted, however, that in addition to tuberculine, the patients were treated with subconjunctival injections of sea water, to which calcium chloride was generally added. The preponderating curative rôle is attached to the tuberculine by Dor, who pertinently enquires whether saline injections are capable of causing re-attachment in four out of five cases of detached retina.

Dor's cases appear to be important enough to justify the following brief abstract of their main features:—

Case No. 1.—A young tuberculous myope with detached retina. Under the treatment of a colleague, the retina became temporarily re-attached. Treatment by tuberculine produced so much improvement that at the end of six months she resumed her work as a midwife, and at the end of sixteen months, there was no trace of the former detachment and the woman could see well near-by and also at a distance. The injections of tuberculine were kept up for several months after she left Dor's *clique*.

Case No. 2.—An adult myope of 10 D. suffered from a large detachment of the left retina, and was able to see a little light only in the outer part of the visual field. After treatment by tuberculine, vision became normal without any limitation of the field. The cure had lasted ten months when Dor reported the case.

Case No. 3.—An agricultural labourer with 20 D. of myopia had complete cure of a detached retina by tuberculine. When the patient resumed work, however, a slight recurrence took place. The man was unable to resume treatment owing to lack of means.

Case No. 4.—A "young woman" of 40 years, hyperopic 3 D., upon whom Dor had performed double iridectomy five years before on account of torpid iritis. Both retinæ became detached, and there

was irido-cyclitis and vitreous opacities. The patient was unable to find her way about. At a later stage in the history of the case, tubercles appeared upon the iris. Under treatment by tuberculine, the tubercles disappeared, the retina became re-attached, and there was striking improvement. Two recurrences. Upwards of one hundred injections of tuberculine were given. For four months now the tension of the eyes has been normal and both retinæ have been in place, although reading is impossible with one eye and difficult with the other, owing to vitreous disturbances.

Case No. 5.—A female aged 44 years, with 6 D. of myopia. Family history of tubercle. Patient herself had definite tuberculous manifestations, including a chronic tuberculous salpingitis. In 1900 detachment of right retina, followed six years later, by a similar condition in the other eye. Tuberculine did not suit the patient, and after four months' treatment, the result as regards the retina was *nil*. Treatment was not commenced until the detachment had already existed for four years.

SYDNEY STEPHENSON.

(9) In common with many other ophthalmic surgeons, **Fromaget**, of Bordeaux, believes mercury to be useless in the treatment of interstitial keratitis due to inherited syphilis. In that affection he contents himself by giving such non-specific remedies as arsenic, potassium iodide, iodotannic syrup, and cod-liver oil, and he attaches particular importance to the influence of the first-named.

Fromaget expresses the definite opinion that mercurial treatment hastens blindness in cases of tabetic optic atrophy.

SYDNEY STEPHENSON.

(10) **Houdart**, of Brest, sings the praises of the intra-venous route of introducing mercury into the patient's system and incidentally condemns the subcutaneous and intra-muscular methods. The cyanide of mercury is employed by Houdart for the purpose.

SYDNEY STEPHENSON.

(11) **Thilliez**, of Lille, reports considerable improvement in sight in what appears to have been essentially a case of retinitis proliferans in a female, 26 years of age, from the intra-muscular injection of fibrolysine, after other remedies had failed. He has employed the same agent in the treatment of leucomata, parenchymatous keratitis, iridic exudations, and vitreous opacities, with more or less success. In some of the conditions named the fibrolysine was also used as a subconjunctival injection. Fibrolysine should be employed with circumspection in old subjects.

SYDNEY STEPHENSON.

(12) **Bellencontre**, of Paris, believes that the subconjunctival injection of 1 per cent. saline with gelatine (*sérum chloruré gélatiné*), as recommended by de Wecker in 1903, has not received the attention it deserves. The formula employed by Bellencontre is as follows: acoine, ogr. oi; *colle de poisson*, ogr. 30; isotonic serum, I cc. One cubic centimetre of this liquid is injected beneath the conjunctiva (not into Tenon's capsule), daily, every second day, or at longer intervals, according to circumstances. The injections, which are painless, may be used quite indefinitely. They have been systematically employed by the author since 1905 in the treatment of certain cases of hyalitis, as well as in vitreous hæmorrhages and in detachments of the retina. He mentions six instances of detached retina treated by their means. One case had scleral puncture also performed. The patients were not confined to bed, but merely enjoined to rest as much as possible. The results can only be described as striking.—In five of the cases, cure resulted with vision varying from $\frac{2}{3}$ to $\frac{1}{2}$ (two emmetropes) and from $\frac{1}{6}$ to $\frac{1}{30}$ (three myopes).

In the discussion that followed the reading of Bellencontre's communication, **Louis Dor**, of Lyons, spoke of cures, partial or complete, of detached retina that had followed the subconjunctival injection of saline solutions to which gelatine had not been added. His solution contained:—sodium chloride, ogr. 50; crystallized calcium chloride, ogr. 50; pure sea water, 20 gr.

SYDNEY STEPHENSON.

(13) After quoting statistics with regard to the frequency of post-diphtherial paralysis, **Cabannes**, of Bordeaux, relates the case of a child, aged $7\frac{1}{2}$ years, where pharyngeal diphtheria (treated early with antitoxin) was

followed eight days later by palatal paralysis, and, after a further interval of thirty-six days, by paresis of both external recti muscles, especially of that belonging to the right eye. Strabismus = 25° . Homonymous diplopia. V. = $1/3$. A couple of days after the injection of 10 cc. of antitoxin, strabismus and diplopia had disappeared, and two days after that, sight had returned to its former condition. A second injection was practised.

Cabannes speaks of Ferré, who wrote in 1903, and of Mongour, who wrote in 1906, as *les véritables promoteurs* of the plan of treating diphtherial paralysis by injections by antitoxin. He does not mention H. Schmidt-Rimpler (*Centralbl. f. prak. Augenheilkunde*, Dezember, 1894, S. 353) who in 1894 reported three cases of diphtherial paresis of accommodation successfully treated by injection.

SYDNEY STEPHENSON.

(15) *Apropos* a case of "rheumatic" iritis which yielded very quickly to the internal administration of aspirin, Allan states that in such cases large doses of the drug should be given and that meanwhile the patient should be kept in bed. Thirty grains of aspirin are administered every four hours, and it is of some importance, in the author's opinion, that the remedy should not be suddenly stopped. Five to ten grains should be given three times a day for a week or ten days after recovery has taken place.

SYDNEY STEPHENSON.

(16) Harry, of Leeds, states that he has treated twenty-five cases of ophthalmia neonatorum with sophol, with results that compare very favourably with the other silver salts against which it has been tested. By the employment of sophol, indeed, corneal complications in the author's experience, have been reduced from 30 per cent. to less than 5 per cent. A 10 per cent. solution is rubbed over the conjunctiva of the everted eyelids by means of a bit of cotton wool twisted around the end of a probe. The effect is kept up by the instillation every four hours of one drop of a 5 per cent. solution of sophol. Secretion should be constantly wiped away, but the infant's rest need not be disturbed except at feeding times.

SYDNEY STEPHENSON.

(17) de Lapersonne and André Lévi, of Paris, working with "606" in eye diseases, record their experiences with their first series of cases, twelve in number.

Adopting the method of treatment with an "open mind" as to results, their desire has been more to satisfy themselves as to whether arsenobenzol is likely to be followed by such sequelæ as has been frequently recorded with other arsenic compounds, notably atoxyl. Their experience, so far, enables them to say that "there has been no need to exaggerate the dangers of '606' as regards vision." Atoxyl may give rise to a true subacute retrobulbar neuritis manifested by definite signs and comparable with the toxic neuritis, experimental or pathological, due to the effect of quinine, male fern extract, carbon bisulphide, etc. So far they are unaware that any such toxic neuritis has been described following the use of "606." The latter's feeble toxicity, coupled with the fact that although given in massive doses, one or only two are administered, renders it much safer, for renal elimination can very quickly occur.

Criticising the four cases described by Singer at Vienna, in which, besides optic neuritis, paralysis of the third and sixth nerves, and peripheral choroiditis with vitreous, are mentioned opacities, the authors consider that these are much more like syphilitic manifestations which have occurred despite "606," for they certainly do not present appearances usually met with in intoxication by arsenical compounds. Further support to their opinions is given by the observations of Contela (*chef*

de clinique) who has methodically examined all the cases injected with "606" in the *clinique* of Jeanselme and Hudelo, with the result that no complication of the nature of toxic neuritis was noted.

In the authors' series of cases Wassermann's reaction was carried out in all and the injections were made in the buttocks.

In the first ten the neutral emulsion was used after Wechselsmann's method, but in the last two the alkaline solution was adopted, according to the plan recently put forward.

The average quantity injected was from 55 to 60 centigrams of soluble alkaline products. In some of the cases on account of the general condition, or the state of the optic nerve, only 45 were injected and in one case only 30.

The results obtained are as follows:—

Iritis and irido-choroiditis—Seven cases were injected, combined, of course, with the usual local treatment. Excellent results with three patients in three days, evidenced by the return to normal of the appearance of the iris, with improvement in vision. In these cases the syphilis was recent and the patients were young: it is just, however, to mention that in one of them in a previous attack four intravenous injections of cyanide of mercury had sufficed to cure the iritis.

In another case, a man of 53 years, rheumatic and gouty, improvement took place more slowly *i.e.*, after eight or nine days, a little pericorneal injection only remaining at that time. He returned, however, a month later with an attack on the opposite side, which was treated with intravenous injections of mercury.

In the last two cases the results were insignificant and prove nothing for or against Ehrlich's method, for in one, a man, there had been ocular inflammation from the age of ten, whilst in the other, there was inflammation of the whole uveal tract, and although Wassermann's reaction was positive, they were not clear types.

Interstitial keratitis, three cases.—One excellent result in a very typical case of hereditary syphilis; mercurial treatment had been already carried out, but the effect was neither so good nor so permanent as that following injection of "606." The other two cases did not benefit.

Optic neuritis, one case only, a young woman of 22 years, with double optic neuritis nine months after the onset of syphilis. Treatment by mercurial intravenous injections with improvement, returned eleven months later with neuritis and chorio-retinitis. Wassermann negative. 30 centigrams of "606" product injected. Rapid improvement, and patient discharged in three weeks, returning, however, with a serious relapse two months later.

Ocular paralysis, one case, in which a slight improvement was obtained. On the third day after injection, ptosis and diplopia disappeared, partly to return on the 9th day, but subsequently becoming as bad as before.

Without wishing to base any definite conclusions on the foregoing results, the authors express themselves satisfied that so far arseno-benzol presents no such dangers to the eye as does atoxyl, that it acts very quickly and very favourably in certain simple cases of iritis or of interstitial keratitis, but that it is powerless in complicated cases of irido-choroiditis of multiple origin, and that the remarkable, although fleeting, improvements obtained in optic neuritis and ocular paralyses are encouraging.

The chief reproach they level against "606" is that it does not give lasting results from one injection alone.

BERNARD CRIDLAND.

(14) This interesting article by **Skrainka** really contains very little specially about the eye. It is an account of the rationale of Ehrlich's researches into the chemistry of the arsenical compounds which have

culminated in the establishment of arsenophenilglycin, or "418," and arsenobenzol, or "606," as remedies directed against the *spirochæta pallida*.

As regards the eye, a number of successful cases of treatment with "606" are briefly quoted by the writer, but at a time when enthusiasm for a new drug is apt to carry one away it will perhaps be more profitable to transcribe here, from Skrainka's article, what has been said by Schanz, writing in *Münchener medizinische Wochenschrift*, November 8th, "My observations in five cases of keratitis parenchymatosa are these: one of the cases having received the injection yesterday, I shall not comment upon it. Of the other four cases, the disease in one was in its incipency, in two the opacity was increasing, and had already involved more than half the cornea, and the fourth the cornea was clearing up. In all these cases the presence of lues was established either from the history of the case or from certain luetic manifestations on the bodies of the patients. In none of the cases was it possible to note a decided influence on the progress of the disease during the first week or two after the injection. In the three cases where the process was advancing, the opacity increased. Here evidently was a luetic condition which was not influenced by arsenobenzol. But in extenuation of these failures I would add, that it may be that on account of the peculiar nutritive conditions of the cornea, a medicine that is so quickly voided by the urine as is arsenobenzol is ineffective in reaching the spot where the disease obtains. Even when mercury and the iodides are used it cannot be said in all fairness that the disease is brought to a standstill. But in the case in which the keratitis was in its incipency the results were better. After the first injection, there being no improvement, I insisted upon making another, but the patient was compelled to leave before this was done. After a few days the patient returned and I noted that the inflammatory process had ceased and the opacities were clearing up. I know of no case of keratitis parenchymatosa in which the progress of the disease has been so quickly stopped and a return to normal conditions so quickly brought about."

ERNEST THOMSON.

BOOK NOTICES.

Golden Rules of Ophthalmic Practice. By GUSTAVUS HARTRIDGE, F.R.C.S. Bristol: John Wright and Sons. Seventy-two pages. Price 1/-

It is difficult to criticize a book of this kind. Although written by a well known surgeon of ripe experience, and although the work has passed through four previous editions, we confess to a difficulty in knowing what manner of men are able really to profit by these "Golden Rules" bijou text-books.

Apart from any such personal opinion, there is, it must be confessed, a surprising amount of information compressed into some seventy minute pages. The *Rules* are in alphabetical order, and proceed from "Accommodation" to "Xanthopsia."

E. T.

A Text-Book of Ophthalmology in the form of Clinical Lectures. (*Lehrbuch der Augenheilkunde in der Form klinischer Besprechungen.*) By Professor PAUL RÖMER. Berlin, N.: 105B, Friedrich Strasse, 1910. Price, 20 Marks, unbound; 22 Marks, bound.

This new text-book is dedicated to Professor Ehrlich. It is a publication of the course of lectures which Professor Römer gave in ophthalmology to his

students at the University of Greifswald, and, in consequence, it must be read and criticised rather as a course of lectures than as an exhaustive text-book. If the book really represents the type of teaching which is given to the ordinary medical student in German Universities, it goes far to explain the enormous amount of original work which is carried out by these students in later years: for we can state, without fear of contradiction, that such a thorough and comprehensive course cannot be obtained in England, even by advanced students who attend special hospitals.

The arrangement of the syllabus is the usual one. The earlier discourses are upon methods of examination, which are thoroughly practical, upon diseases of the conjunctiva, lids, and cornea. Then, the iris is taken and the lens. The other structures of the eye follow in a regular anatomical sequence. Each lecture is illustrated by microscopical and anatomical preparations, and any operation described is performed before the class. These operations are shortly explained in the text; but as there are no diagrams to illustrate the methods employed, the descriptions are difficult to follow. In fact, the operative details had better have been omitted.

The chapter on corneal disease contains a useful table which shows graphically how these affections may be rapidly classified, and it should certainly help a student to make a differential diagnosis. The student and the general practitioner are advised to make smear preparations from conjunctival discharges and corneal ulcers, and so obtain a sure knowledge of their ætiology. The methods described are so simple that they are within the reach of all who possess a good immersion lens. The indications for treatment are in all cases clear and precise, and the practitioner is taught to differentiate between cases which he can treat himself and those to which he should only render "first aid" before sending them on to a specialist.

Knapp's roller forceps are recommended for "expressing" trachoma follicles. Grady's forceps, or rather Cropper's modification of these forceps, are in most cases equally efficient, and do not bruise the lids nearly so much; nor is their use so painful. The ætiology of trachoma is left an open question. The author does not definitely accept the theories of von Prowazek and Greeff. The association of trachoma and gonorrhœa, emphasized by Herzog, is hinted at, although Herzog is not mentioned by name.

Corneal ulcers receive adequate attention. Phlyctenular ulcer is called "eczematous" ulcer. On page 169 there is a bad misprint. It is there stated that the infiltrations which are associated with this form of ulceration are composed of accumulations of cells under Descemet's membrane. This must be an error for Bowman's membrane, which is mentioned two pages later.

Römer, as well known, is an ardent advocate for the use of pneumococcal serum in *ulcus serpens*. In these lectures he takes an unnecessarily optimistic view as to its virtues, which appears to be quite out of place in teaching addressed to students. The author must be aware that ophthalmologists in general have not confirmed the favourable views he himself holds. If the author's counsel should lead surgeons to postpone cauterization and to trust to serum therapy in these rapidly destructive ulcers, real harm will have been done. Although Römer so enthusiastically advocates pneumococcal serum, he is very doubtful of the value of tuberculin in tuberculous eye disease.

The lectures on iritis are excellent, one can imagine no better for the student, and few experts will read them without becoming wiser by so doing. Römer, despite all that has been written against the existence of rheumatic iritis, devotes (and we think rightly) several pages to its symptoms and signs. He carefully distinguishes gonorrhœal iritis from rheumatic, gouty, and

diabetic iritis. While admitting that the clinical appearance of the eye does not always afford pathognomonic evidence of the ætiology, yet in most cases careful examination will often elicit several suggestive appearances. An early roseola of the iris is described corresponding to the early roseola of the skin in syphilis. A early and late papular iritis is recognised and carefully separated from the gummatous form. These pages are very valuable, and should be carefully studied. The Wassermann reaction is explained at some length. Full weight is allowed to the part played by the tubercle bacillus in the genesis of iridocyclitis. We, however, search in vain for any mention of oral sepsis as a fruitful source of inflammation of the iris. We noticed the same omission from Axenfeld's text book. It would appear that this common cause is not so fully recognised in Germany as it is in Great Britain. Römer states that in his clinic only 25 per cent. of all cases of iritis can be ascribed to syphilis. This is an interesting fact, especially when in England some ophthalmologists would place the figure at 70 per cent.

The lectures upon cataract are not of quite the same high order as those we have just noticed, and the advice given does not seem in every respect to be sound. For example, the general practitioner is told that the question of maturity of the cataract is of no moment whatever. The only point to be considered, Is the loss of vision sufficient to prevent the patient from fulfilling the functions of life? We are led to suppose that the results of extraction of unripe cataracts are as good as those of mature. In fact, Römer designates the orthodox views as "hoary theories." He operates freely upon unripe lenses, removing the masses of lens matter with a small shovel. The views of de Micas, who writes of the results of cataract extractions, are of an exactly opposite nature (*Recueil d'Ophthalmologie*, septembre, 1910). Quoting Lagrange, he says: "Le secret de succès opératoire dans la cataracte est, comme le dit Lagrange, pour une très large part dans le diagnostic attentif de la maturité, et j'ajouterai que moins la cataracte est mure, et plus le malade doit être docile." These views will be endorsed by most careful surgeons, and few will be willing to shovel out lens masses at the risk of vitreous escape. The author does not use a mask and head bag, which, however, he admits are necessary in general surgery. His reasons are quite unconvincing. He says the wound is too small to be subject to mouth infection!

The few words given to operations for trichiasis shew only too plainly that the author's experience must be limited. Among other things, he advises that the skin of the upper lid be grafted into the split made in the lid margin in the Jaesche-Arlt operation. This procedure always leads to trouble, and the graft has to be removed and replaced by mucous membrane.

Römer holds sound views about dacryocystitis. Although he gives directions for probing the duct when stenosed, he is convinced that the number of cases cured is very small, some 5 to 10 per cent. In all cases of chronic dacryocystitis he excises the sac, and we cannot but feel that this practice will eventually become general.

The author is strongly in favour of the conservative treatment of glaucoma. No operation should be performed, except in very acute cases, until it has been shewn that myotics are ineffective. Iridectomy is the best procedure in acute glaucoma; in subacute glaucoma cyclodialysis often succeeds and may be followed by iridectomy. In chronic glaucoma iridectomy is of no use, and often does harm. Sclerotomy, as described by de Wecker, is the operation of election. The modern operations for securing a filtering cicatrix are not described or discussed; in fact, all that is said is that some surgeons have endeavoured to secure such a cicatrix. As far as we can see, Herbert,

Lagrange, Elliot, and Freeland Fergus are not even mentioned. The work of Thomson Henderson is barely alluded to. The lectures on glaucoma are very sound, but not quite up to date.

Römer's book, taken as a whole, is an excellent one, and the coloured plates are very beautiful. It is large for the English student, but a keen man would learn an immense amount by reading it. All lecturers on ophthalmic surgery will find it useful. We sincerely hope that it will be translated into English.

T. HARRISON BUTLER.

NOTES AND ECHOES.

Deaths.

FRANK HAMILTON OSWALD, house surgeon at the Cheltenham Eye, Ear, and Throat Hospital, was recently found in bed in a state of collapse with a vein in his leg severed, and a razor lying by his side. Death occurred shortly after he was found. Mr. Oswald graduated M.B., B.Ch., at the University of Dublin in the year 1898.

We regret to announce the death of Gerald George Hodgson, which occurred suddenly from an accident, on February 3rd, at the age of 50 years. Mr. Hodgson, a man of singular amiability, had for several years held the post of refraction assistant to the Royal Eye Hospital, Southwark, London. Mr. Hodgson gained the Warneford scholarship at King's College, London; and after taking his medical qualifications, he was appointed house physician to King's College Hospital. He was an ardent and accomplished student of entomology and botany.

Frank N. Lewis, surgeon to the Manhattan Eye, Ear, and Throat Hospital, and professor of ophthalmology in the Post-Graduate Medical School, died on November 13th last, at the age of 53 years.

The death is announced, at the age of 48 years, of Robert H. Duncan, of the Manhattan Eye, Ear, and Throat Hospital, New York City.

* * * *

Appointments.

DR. EMRYS JONES, surgeon to the Manchester Royal Eye Hospital, has been elected president of the Manchester Medical Society for the present year.

Mr. Charles Adair-Dighton has been appointed honorary assistant surgeon to the Eye and Ear Hospital, Myrtle Street, Liverpool.

Mr. H. C. Mooney has been appointed ophthalmic surgeon on the staff of St. Vincent's Hospital, Dublin.

Mr. Henry V. McKenzie has been appointed honorary ophthalmic surgeon to the Moretonhampstead Cottage Hospital, Devonshire.

Mr. W. S. V. Stock has been appointed anæsthetist to the Bristol Eye Hospital, and Mr. A. J. M. Wright, rhinologist to the same institution.

Dr. Pietro Baiardi has been promoted to the chair of ophthalmology in the University of Genoa.

Dr. Adolf Gutmann has been recognized as *privat-dozent* of ophthalmology in Berlin.

Dr. G. Lodato has been promoted to the chair of ophthalmology in the University of Palermo.

Dr. Charles H. May has been appointed consulting ophthalmologist on the Fourth Division of Bellevue Hospital, New York.

* * * *

Royal Eye Infirmary,
Plymouth.

THE KING has graciously consented to become patron of the Royal Eye Infirmary, Plymouth, in succession to his late Majesty.

* * * *

A Scottish Ophthalmological Club.

A CIRCULAR has been issued by two prominent Edinburgh ophthalmic surgeons to their colleagues in Scotland suggesting that a meeting should be held two or three times a year for the purpose of discussing more or less informally eye cases of interest. The idea is to hold the meeting now in one and now in another town. A chairman for each meeting would replace the customary president. As far as possible, there should be no laws or by-laws. Membership would be open to anybody holding an ophthalmic appointment at a public hospital or dispensary in Scotland.

* * * *

The Prevention of Blindness.

WE have been interested to receive from Dr. F. Park Lewis, of Buffalo, the Second Annual Report of the Committee on Prevention of Blindness, of the New York Association for the Blind. This report deals with the valuable educational, legislative, and investigatory work of the Association during the past year. From an accompanying cutting from *The New York Sun*, of December 18th, 1910, we learn with pleasure that a National Society has been formed there for the prevention of blindness and conservation of vision. The meeting at which the Society was organised had been called by Dr. Lewis of the American Medical Association Committee on Prevention of Blindness. The object of the organization is to unify the campaign which has been carried on by separate organizations in various States and localities. The committee on organization recommended that the society include all persons and bodies desiring to co-operate in "prevention of infantile blindness, prevention of blindness from industrial and other accidents and from disease, and conservation of vision through improved hygiene during school life, and in 'industrial occupations,' and that it invite the co-operation of prevention societies now in existence, of State and national medical societies, educational bodies, labour organizations, commercial bodies, women's clubs, and the like." An organizing board of directors was recommended, with Dr. Lewis as chairman.

* * * *

A new Ophthalmic Hospital.

BY way of commemorating the Viceroyalty of the Earl of Minto, the Maharaja of Mysore has laid the foundation stone of an ophthalmic hospital in the city of Bangalore, Mysore, India.

* * * *

Col. H. Smith.

A KASR-I-HIND MEDAL has been awarded by the Government of India to Lieut.-Col. Henry Smith, I.M.S., the famous advocate of the intra-capsular extraction of cataract. According to a recent number of the *British Medical Journal* (January 28th, 1911, p. 225), this "is the latest and least valued decoration." Comment is needless!

* * * *

Examinations in ophthalmology. AT a quarterly meeting of the Council of the Royal College of Surgeons of England, held on January 12th last, it was reported that a letter had been received from the British Medical Association, forwarding a copy of the following resolution adopted by the Council of the Association :

"That it is desirable that diagnosis and treatment of diseases of the eye, including the estimation of refractive errors and retinoscopy, should be compulsory subjects in every medical curriculum, and that every student should undergo a practical examination therein."

It was determined to refer the communication to the Committee of Management of the Conjoint Examining Board.

* * * *

A Scholarship in Ophthalmology. FROM our contemporary the *American Journal of Ophthalmology* we gather that a scholarship in ophthalmology, the income of which amounts to about seven hundred dollars a year, has been founded at Columbia University, New York, which was founded by royal charter in 1754 as King's College. It is intended to perpetuate the memory of the late Dr. Abram DuBois. The scholarship is open to graduates of the College of Physicians and Surgeons, who have completed a term of service at an eye hospital, and who have given evidence of a serious intention of pursuing ophthalmology as a career. The holder is expected to devote himself to post-graduate studies of a scientific character connected with ophthalmology in foreign and native universities.

* * * *

French Ophthalmological Society. OUR old friend the French Ophthalmological Society will meet in Paris on May 1st at 51, rue de Clichy. The discussion, to be opened by Professor Rollet, of Lyons, will be on Tuberculosis of the Lacrymal Passages.

* * * *

Oxford Ophthalmological Congress. THE Oxford Ophthalmological Congress will be held from July 12th to 15th next at Keble College, Oxford. A good deal of attention will be paid during the meeting to the new preparation "606" in the treatment of affections of the eye.

* * * *

Dr. Glascott. DR. GLASCOTT, late lecturer on ophthalmology in the University of Manchester, and senior consulting surgeon to the Royal Eye Hospital, has been elected on his retirement from practice, one of the Vice-Presidents of the Hospital with which he has been connected for the last forty-two years.

* * * *

THE OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

VOL. IX.—No. 4.]

APRIL 1, 1911.

[TWO SHILLINGS.

CONTENTS.

Original Communications.—

	PAGE
1. Derrick T. Vail, M.D.—Lantern Demonstration of the unmodified "Smith" Operation for Cataract	232
2. Percy Fridenberg, M.D.—The Operative Management of Atypical Cataracts (juvenile non-senile)	245
3. D. W. Greene, M.D.—Smith's Cataract Operation	250
4. John Edwin Brown, M.D.—Concerning Congenital Cataract: comments upon sixty-six cases in the Ohio State School for the Blind	259
5. W. A. Fisher, M.D.—The Choice of a Cataract Operation	263
6. Major G. H. Fink (retired).—Contra-indications to the Intra- capsular Operation for Cataract	266
7. Major R. H. Elliot, M.D., F.R.C.S.—Two cases of Morgagnian Cataract in which no trace of a nucleus could be found at the time of operation, together with some remarks on the Clinical Classification of Senile Cataract... ..	275
8. Sydney Stephenson.—A note upon the Development of Lamellar Cataract	279

Current Literature.—

I. The Pathogeny of Cataract	280
II. Electric Cataract	282
III. The Non-Surgical Treatment of Cataract	283
IV. Operations (Cataract)	285
V. Complications during and after the Extraction of Cataract	292
VI. The Recovery of Cataract, senile and otherwise	295
VII. The Specific Action of Lens Albumen	296
VIII. Instruments	297
IX. Miscellaneous Communications	298
Book Notices	301
Notes and Echoes	305

ORIGINAL COMMUNICATIONS.

LANTERN DEMONSTRATION OF THE UNMODIFIED "SMITH" OPERATION FOR CATARACT.*

BY

DERRICK T. VAIL, M.D.,

CLINICAL PROFESSOR OF OPHTHALMOLOGY, UNIVERSITY OF CINCINNATI; OPHTHALMOLOGIST TO THE CINCINNATI (MUNICIPAL) HOSPITAL, GERMAN DEACONESS' HOSPITAL, ETC.

THROUGH the kindness of my friend, Dr. Greene, of Dayton, Ohio, I was given an opportunity of accompanying him on a visit to Lieut.-Col. Smith's Clinic at Jullundur, India, where I worked between the dates September 27th and November 10th, 1909. Dr. Clark, of Columbus, was also there. This paper is a brief report of Smith's operation for cataract as done by Smith himself.

I was given a rare opportunity to study and observe every point and detail of technic Smith employs in his cataract operation. I made copious notes while standing at the side of the operating table during ninety-nine actual operations, jotting down every minute detail from start to finish. I played the rôle of assistant in over fifty other operations until I learned all the points. I then did three hundred and fifty operations on my own account, keeping careful record. I also observed Smith and others do upwards of six hundred more, and I made many sketches from poses kindly granted by Smith himself, Noor Ali (his favourite assistant), and the native patient. To give a full report on this occasion of all that I observed and jotted down would be impossible, for it would consume hours. I can only show some of my sketches and a few photographs, the latter taken since my return. The sketches, although the work of an amateur, and hastily done, are accurate, illustrative, and perhaps interesting because they were taken "on the spot." Lieut.-Col. Smith has seen them all and approved them. I cannot show all I made for want of time. The full set appears in Smith's book on "The Treatment of Cataract," published by Messrs. Thacker, Spink, and Co., of Calcutta, India.

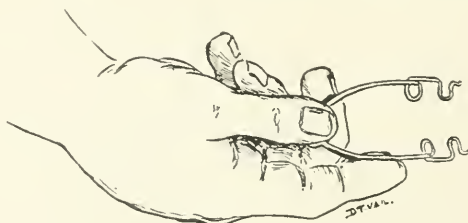


FIG. 1.

FIGURE 1.—This illustrates the Jullundur speculum and the manner Smith handles it. The speculum has a light spring and no catch or fixation screw. The advantage of this method of handling the speculum is that it is under perfect control and can be removed with one hand as quickly as a flash, which is sometimes worth knowing.

*Read before the 15th Annual Meeting of the American Academy of Ophthalmology and Otolaryngology, held at Cincinnati, Ohio, September 19th-21st, 1910.



FIG. 2.

FIGURE 2.—Preparing the eye for douching. The assistant grasps the speculum at its joint and lifts the eyelids away from the ball, while the fingers of his left hand forcibly retract the brow, thus obliterating all the rugæ of the upper fornix to allow effective douching of the conjunctival sac in its entirety. This is done by means of a $\frac{1}{2}$ inch stream of 1/2000 bichloride with a 3 foot drop. No swabs or sponges are used.



FIG. 3.

FIGURE 3.—A group scene, taken in my operating room since my return, posing to illustrate the Jullundur method of flushing the conjunctival sac prior to all cutting operations on the eyeball.

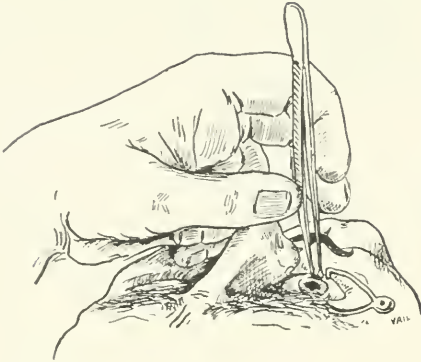


FIG. 4.

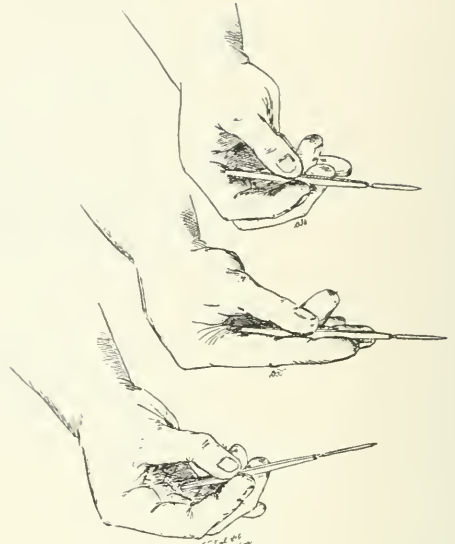


FIG. 5.

FIGURE 4.—Showing the operator's left hand in the act of grasping the conjunctiva below the cornea prior to section, while steadying his hand on the side of the patient's nose and incidentally steadying the patient's face. At this stage the assistant applies the thumb of his right hand to the eyebrow to keep it under control during the section about to be made.

FIGURE 5.—Showing a sketch of Smith's right hand holding the knife for sectioning the right eye during three stages of the section, (1) the point entering the limbus at the horizontal meridian, (2) fingers straightened out when section is half finished, (3) completing the section by finger movement, allowing the end of the handle to disappear deep in the hollow of his hand.

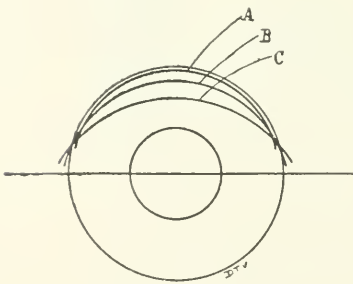


FIG. 6.

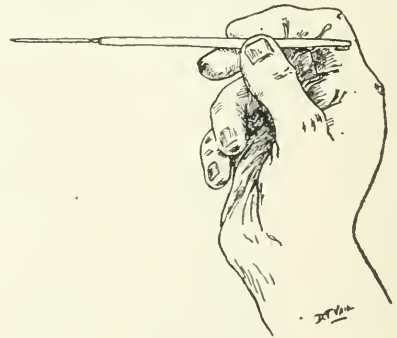


FIG. 7.

FIGURE 6.—Showing three lines of section Smith employs: (a) rarely, (b) commonly, (c) occasionally. He prefers a knife that has been resharpened several times, until the blade is very thin, short, and narrow. Weiss, of London, resharpens them, and those that are sent back marked "dangerous" he likes best. He always turns the edge away from the iris at an angle of 15° to 30° , and makes the cut with one forward stroke, lowering the handle, and occasionally a slow return stroke, raising the handle, cutting entirely in the cornea—no flaps. Smith's section is a little larger than the ordinary one and the cut is as nearly at right angles to the cornea as possible.

FIGURE 7.—Showing first position in holding the knife for sectioning the cornea of the left eye, edge up, cutting away from himself.

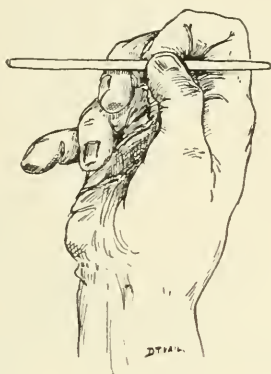


FIG. 8.

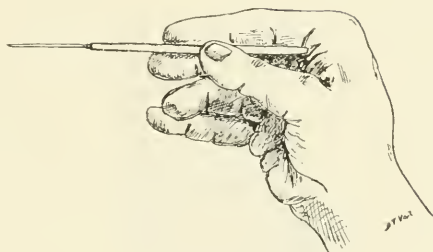


FIG. 9.

FIGURE 8.—Second position of the knife for sectioning the left eye. The fingers are drawn back to their limit. The point is applied to the limbus and the knife held very loosely.

FIGURE 9 —The third position when section is half finished with fingers straightened out. No arm movement is made ; the entire section on right or left eye is done with finger movement.

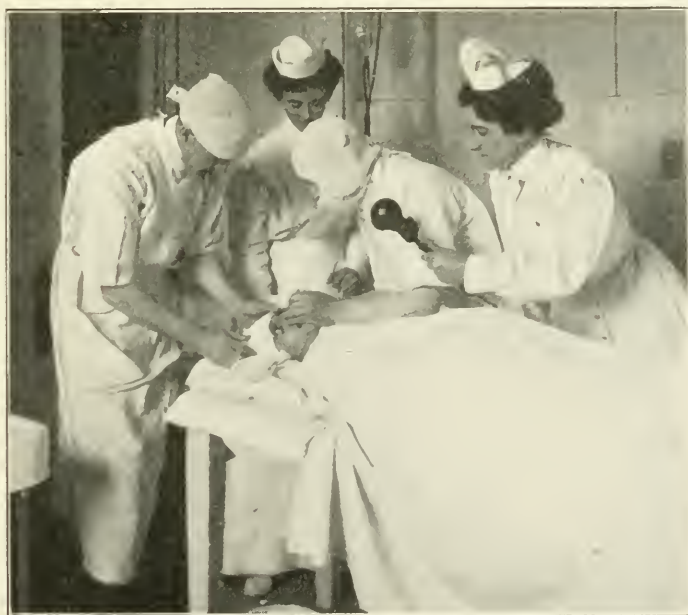


FIG. 10.

FIGURE 10.—Group photo, showing the pose while sectioning the left eye.

We now come to the iridectomy as Smith does it. The assistant grasps the conjunctiva at the same place the operator had hold of it in making the section and slowly rotates the eyeball downward.

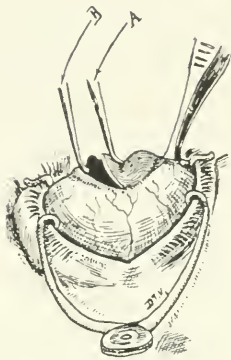


FIG. 11.



FIG. 12.

FIGURE 11.—Shows one jaw of the iris forceps just within scleral side of the wound, while the other jaw is depressing the cornea and causing the iris to bulge upwards in the wound; as it does this, the jaws are closed to grasp the iris lightly and the forceps turned a little to favour the scissors. The forceps are held vertically to the eyeball.

FIGURE 12.—Shows the position of Smith's hands in the act of cutting the iris. Notice how the last two fingers of the left hand are firmly applied to the brow to keep it under control: also his method of holding the scissors in the right hand, palm upward, like a cup, and the rings of the scissors barely in the grasp of the tip of the thumb and ring finger, the forefinger steadying the scissors at the joint. The cutting is slowly done near the joint of the scissors, not at the point.



FIG. 13.

FIGURE 13.—Showing a group scene to illustrate Smith's method of doing the iridectomy.

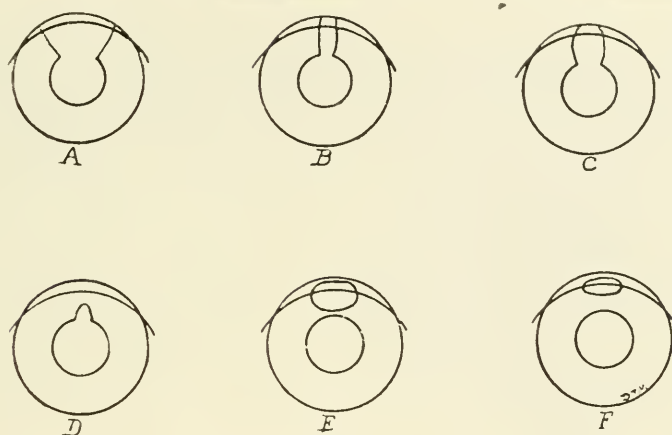


FIG. 14.

FIGURE 14.—Showing different kinds of iridectomy: (*A*) too wide, (*B*) too narrow, (*C*) correct, (*D*, *E*, and *F*) "flukes," which will not deter him from going ahead and delivering without attempting to correct.

The speculum is now removed from the eye, reversing the movements made in introducing it, and the conjunctival sac "stripped" of tears and aqueous by means of the thumb or finger passing slowly over the closed lids from inner to outer canthus with slight pressure. The assistant now inserts the lid hook. After the iridectomy is completed and until the operation is finished, the upper lid is held away from the eyeball by a large-sized strabismus hook in the hands of his assistant. I will first show the wrong way of doing this and then the right way.



FIG. 15.

FIGURE 15.—Shows the wrong way. The assistant's right forearm is too low; there is not room enough for the operator to get his left hand under the assistant's arm.



FIG. 16.

FIGURE 16.—Shows the proper way for the assistant to approach the eye with the lid hook. The hook is about to be inserted at the outer canthus. The nails of the last two fingers are applied to the patient's brow to keep it under control, and prevent squeezing. The hook is held at and below the junction of the shaft and the handle. The thumb nail faces the patient's feet, and the elbow is high up to allow plenty of room for the operator to get at the field of operation with his left hand, which holds the emergency spoon.

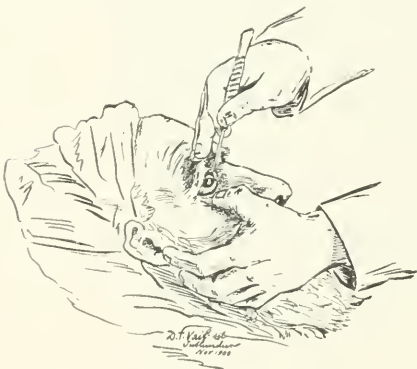


FIG. 17.

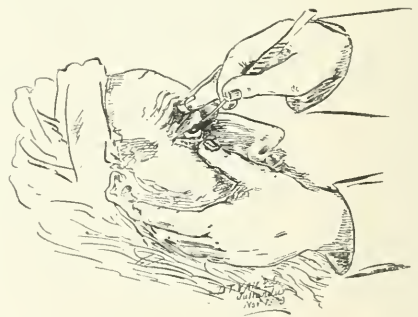


FIG. 18.

FIGURE 17.—Sketched at Jullundur, Noor Ali posing. Notice the straight position of all the fingers of the right hand, the hook being held between the thumb and index finger and the elbow high. Notice too that the thumb of the left hand is flexed in depressing the lower lid, while the palm of the left hand and the fingers are grasping the cheek and jaw to steady the patient's head. This patient will not squeeze or shake his head, as he is "fouled" by the assistant. Notice that the handle of the instrument is directed a little toward the crown of the patient's head.

FIGURE 18.—This is a companion sketch to the last, showing what the assistant does (**without being told**) just as soon as there is the slightest indication that vitreous escape is imminent. The handle of the lid hook is **deflected toward the patient's feet** while the end of the hook is made to still further raise the tissues of the *cul-de-sac*, thus taking every vestige of weight off the ball and favouring the return of vitreous to its bed. The thumb of the left hand, which is retracting the lower lid *ad maximum*, is now straight to allow room for the operator to see up under the upper lid, thus not narrowing the size of the field in spite of the new position of the upper lid.

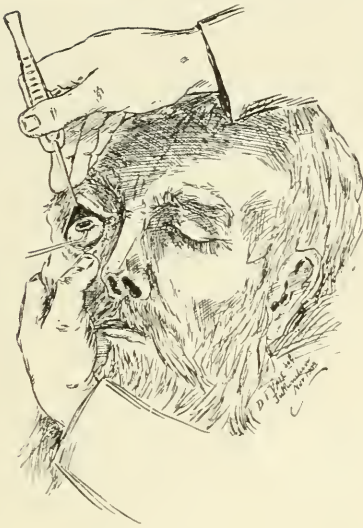


FIG. 19.



FIG. 20.

FIGURE 19.—Shows how things look from in front (spectator's view), while the lids are being held by the assistant and the hook for expelling the lens is applied. Notice the gable-like space under the upper lid above the eyeball. The operator may look obliquely under the upper lid in this field and see a good exposure of the entire upper *cul-de-sac*. The assistant can shift this exposure to the right or left to enable the operator to have an unobstructed view of the lens and wound; also to give him access to the angles of the wound and the summit, too, when replacing the cut sides of the iris and the apron of the iris that adheres to the scleral wound after delivery.

FIGURE 20.—Shows where the bulbous end of the lens hook is applied in the act of pressing to expel the lens. The pressure is made "straight back toward the optic nerve" without a moment's hesitation or dallying, not quickly or plungingly, but with intelligent and bold onward pressure, never varying the direction of the pressure until you see one of two things, either the lens break its moorings above or below and show a disposition to be born, in which case you favour the exit by shifting the pressure, or the lens stubbornly refuse to yield and advance because of tough ligaments, small size of the incision, or what not.

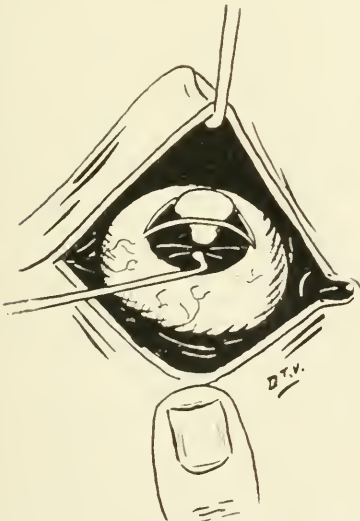


FIG. 21.

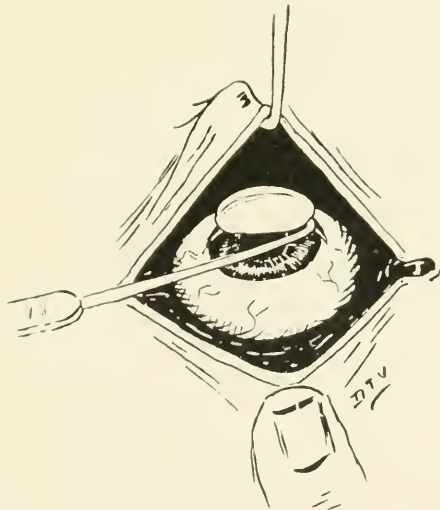


FIG. 22.

FIGURE 21.—Showing front view of the same. The lens is coming up nicely and the equator will soon pass the incision. The pressure is still deep, but about to be shifted upward to drive the lens

out and keep all gaps between lens and incision closed. The operator is standing to the **patient's right with his head low toward the patient's chest**, so that he can see exactly what he is doing. The view he gets is about as shown in this sketch.

FIGURE 22.—The lens lies outside the eyeball. The cornea has been tucked behind it and the operator is removing it from its last moorings, at the same time "ironing" the incision in good approximation by using the hook like a golf club (mid-iron) is used to rake a golf ball from a pond into which it has fallen, not forcibly, but coaxingly and gently, yet making good progress, being careful that the tip of the hook is not caught in the wound. To guard against this, the elbow of the hook must depress the lips of the wound under the lens, while the bulbous end is directed nearly vertically away from the incision.

I will now show ten outline sketches from my collection, designed to illustrate the delivery *à la* Smith: the idea was borrowed from those illustrating Greene's paper, read before the Ophthalmic Section of the American Medical Association three years ago.

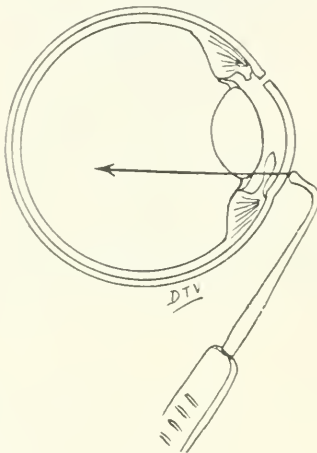


FIG. 23.

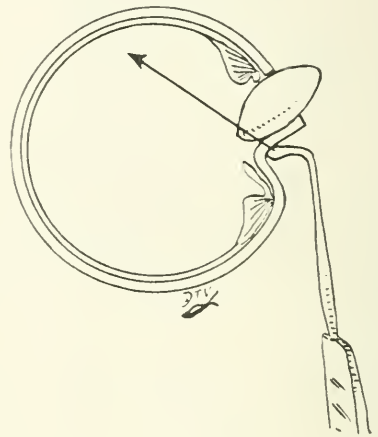


FIG. 24.

FIGURE 23.—Shows first position of the lens hook as applied to the eyeball after section and iridectomy. Note direction of pressure as indicated by the arrow in each of these.

FIGURE 24.—Shows lens about to be delivered upright. The cornea is being tucked behind the lens as lens advances from the eye.

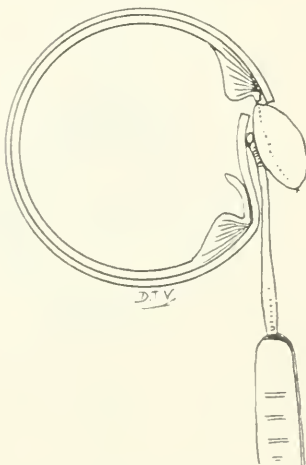


FIG. 25.

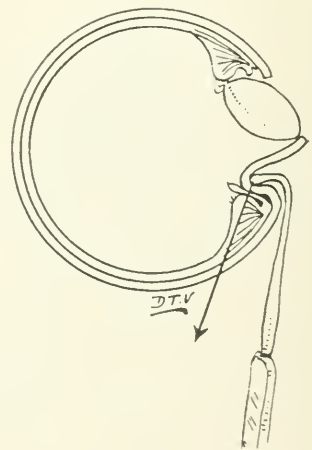


FIG. 26.

FIGURE 25.—The lens is born and the cornea is properly tucked under it to prevent its settling back in the eye.

FIGURE 26.—This is a "tumbler," which is discovered after the primary pressure was made, as shown in Figure 23, the lower edge advanced and upper edge receded. We must favour this somersault or half-somersault by making traction away from the incision by means of the hook caught on the ciliary ridge and pulling directly toward the patient's feet and at the same time not making deep pressure.

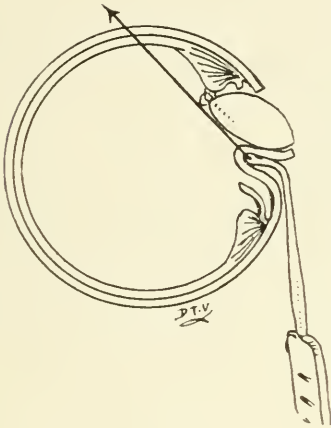


FIG. 27.

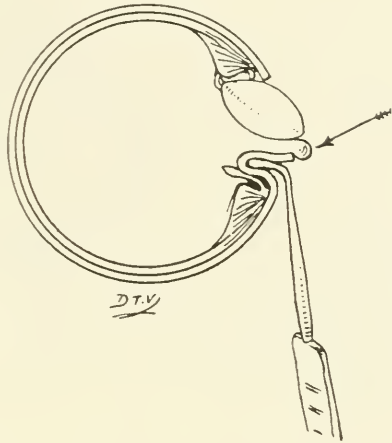


FIG. 28.

FIGURE 27.—As the lens advances after it has severed its lower ligamentous attachments and is turning, the pressure is shifted to follow it up and is now no longer toward the patient's feet, but toward the top of the head to keep all cracks and gaps between lens and wound closed, to prevent vitreous escape. If traction is kept up too long, no advance of the lens will take place, but you will see a vitreous presentation as illustrated in each of the next two sketches.

FIGURE 28.—The cornea should have never been permitted to leave its hugging approximation to the lens. The pressure was continued towards the patient's feet too long.

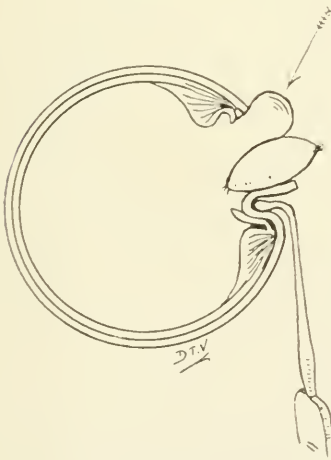


FIG. 29.

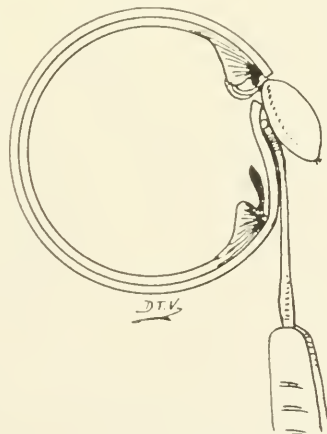


FIG. 30.

FIGURE 29.—Sometimes the vitreous will present above; in fact, will do so in the majority of these cases where the pressure is not intelligently made with the hook below. This and the last plate show the result of clumsy operating and lack of skill.

FIGURE 30.—Shows the cornea tucked under and behind the lens that has been successfully delivered by turning.

As regards spoon delivery.—The lens spoon held by the operator in his left hand is an emergency instrument and is used only as a “present help in time of trouble.” If the lens is “stiff” and refuses to move when intelligent pressure has been applied, it may mean that the eye is a “low tension” one, and all that is needed to increase the tension of the vitreous and start the lens forward and cause the ligament to separate is, to apply the end of the spoon against the eyeball lightly at any point near the point of pressure being made by the lens hook. The pressure with the lens hook is kept up steadily, neither increased nor lessened, while the eyeball is given a little slow kick with the lens spoon. This will start the lens in the majority of cases of stubborn lenses.

Sometimes and unavoidably, even in the hands of experts, the lens will show a stubborn resistance, even after this nudging has been employed, until finally, as the result of too great pressure, the vitreous lets go and you have now to pass the other (uncontaminated) end of the spoon into the vitreous chamber behind the lens and effect rather speedy delivery by using the spoon in a two-fold capacity—first, to hold back the vitreous; second, to afford a background for the lens to be forced out against.

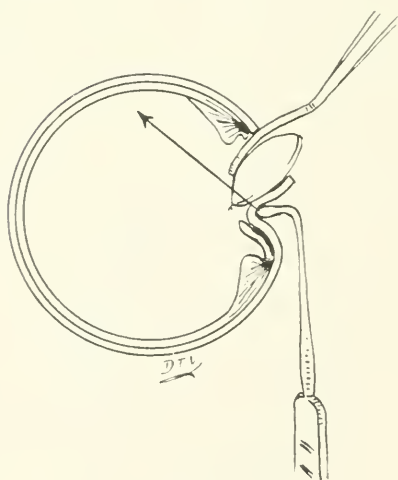


FIG. 31.

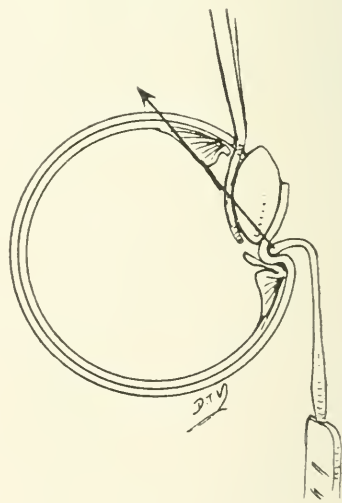


FIG. 32.

FIGURE 31.—The vitreous has only “presented.” The spoon is not introduced far into the vitreous, but only just behind the upper rim of the lens and slightly within the vitreous chamber. The pressure with the lens hook against the cornea has been held in abeyance during the introduction of the spoon, but after the spoon is in place, the pressure now follows the lens and drives it out of the eye against the spoon as a stationary inclined plane.

FIGURE 32.—If there has been actual loss of vitreous and more coming, the spoon is dropped down behind the lens until it is deep in the vitreous and just back of the lens. The spoon is now held fixedly and the lens expelled by pressure through the cornea by means of the lens hook. Thus at no time is the spoon ever used to rake the lens out of the eye.

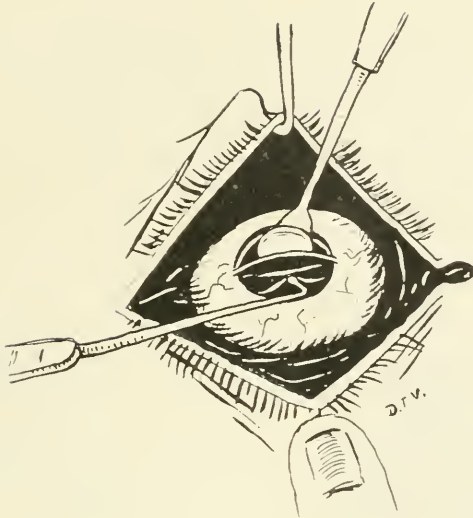


FIG. 33.

FIGURE 33.—Shows front view of a spoon delivery. The method of dealing with the lens in cases of rupture of the hyaloid that Smith teaches and employs, robs the operation of intra-capsular extraction of much of the terror it would otherwise inspire, for by this technic, rightly carried out and with cool judgment, there is rarely a calamitous loss of vitreous and usually if any at all is lost, it is a slight amount.

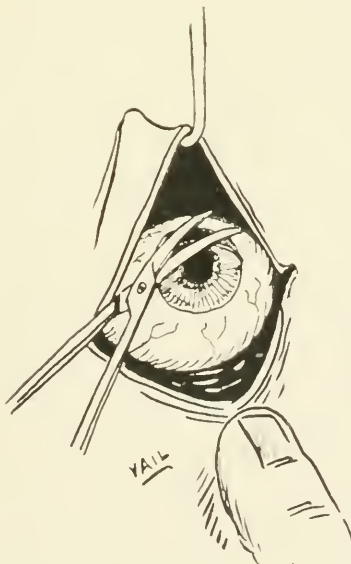


FIG. 34.

FIGURE 34.—Smith's assistant will continue to control the eyelid with his lid hook slightly tilted to lift the fornix tissues well away from the ball, and Smith will trim off the vitreous with a pair of strabismus scissors, curved on the flat, also replacing the iris as best he can, but will not manipulate the eye very much. The assistant will pay as much attention to keeping the lower lid *retracted to the limit* with his left thumb, as he pays to keeping the upper fornix tissues from weighting the collapsed eyeball.



FIG. 35.

FIGURE 35.—If the capsule has been ruptured and no vitreous has been lost, he passes the iris forceps in the pupil space by turning the flap of the cornea down, opening the blades slowly to the indicated extent, and then going deep into the patellar fossa after it; and he usually secures it on the first or second attempt. Smith says to leave a capsule in the eye is far worse for the welfare of that eye than the loss of one-third of the vitreous.

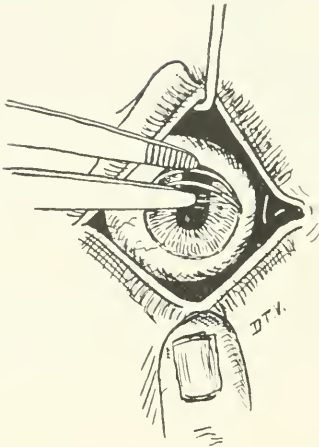


FIG. 36.

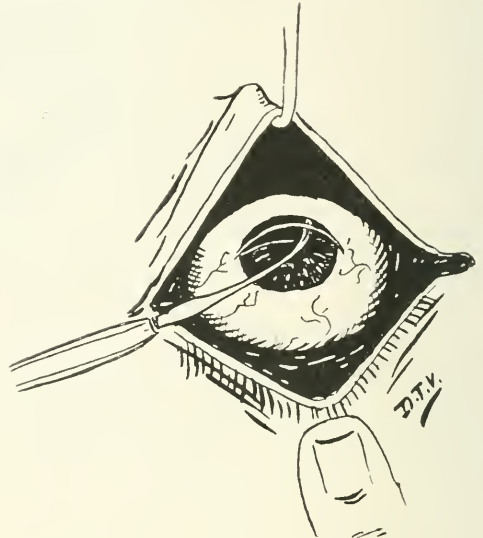


FIG. 37.

FIGURE 36.—Sometimes the ruptured capsule hangs half in and half out of the wound, or it lies in the aqueous chamber close to the wound. He will secure such lost capsules by the use of Weiss's dissecting forceps, which instrument he uses with the same masterful dexterity that he employs in all his instrumentation.

FIGURE 37.—The last step is the replacement of the root of the iris and loosening the iris from the angles of the wound. This he does by passing a blunt instrument, spatula, closed iris forceps or lens hook, under the scleral lip of the wound from below. Starting at one end of the wound, he will slowly and lightly pass the blunt instrument across, between the iris and cornea to separate the agglutination that has taken place between the root of the iris and the cornea as the result of the passing out of the lens. You will notice that he does not pass the spatula from above downwards, but passes it from below upwards.

The assistant maintains an unaltered position from the time following the iridectomy until the toilette is completed. He then gently closes the eye, smears a 1 per cent. yellow oxide ointment along the lashes of both eyes, applies a small, square patch of wet gauze, over which he places a thin layer of cotton and a light "figure of eight" gauze bandage. The patient is carried to his bed on a canvas stretcher slung on two poles.

As regards results.—I can only say that they were uniformly good as regards visual results, and good as regards cosmetic results. I have always disliked updrawn pupils, and most of Smith's cases presented this result to an inconspicuous degree, but the cause of the updrawn pupils was not adhesion between iris and cornea. I was delighted to notice that incarcerations and entanglements were the very great exception. I wish to repeat that the results in India were remarkably beautiful and that the cornea was usually very bright and clear, with good vision.

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THE OPERATIVE MANAGEMENT OF ATYPICAL CATARACTS (JUVENILE NON-SENILE).

BY

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OPHTHALMIC surgeons are pretty well agreed as to the operation of choice in what we may call the typical, *i.e.*, the mature senile form of cataract.

There is practical unanimity of opinion as to the value and scope of iridectomy (preliminary or contemporary), anterior chamber irrigation, the conjunctival flap, various forms of fixation, and while the advantages as well as the dangers of extraction in the capsule have been widely discussed without as yet allowing us to draw absolute conclusions, the impression is general and well-founded that this modification in its present form is too hazardous to be universally applied.

In marked distinction to the progress which has been made in systematizing and perfecting the operation for senile cataract we note a marked divergence of theory and practice in the treatment of what I may call "atypical forms of cataract." This is expressed in the variety of operative procedures employed by different surgeons, and on different occasions by the same operator, by the lack of a definite plan in the teaching conveyed by text-books and instructors in ophthalmology, and even by the divergence of opinion on so fundamental a point as the operability or non-operability of this form.

The question has hardly been formulated, to say nothing of its being still *sub judice*.

It is the object of my communication to consider the commoner forms of non-senile cataract, to bring out discussion as to the principles which should guide our judgment and lead us to a decision in the matter of treatment, and, finally, to point out some of the dangers and complications, which in my experience and those of the ophthalmologists whose work in this field I have studied for some time, present a special problem, as interesting as it is important.

Under the broad title of "atypical cataract," I include, as indicated, all those cases which do not come under the head of senile cataract. We may divide these into a number of large groups: the congenital cataract, of zonular, polar, or purely nucleo-cortical type; juvenile cataracts; and traumatic cataracts. Diabetic cataract, lenticular sclerosis, and such special forms usually seen in middle life, as glassblower's cataract and others similarly due to the action of radiant light and heat, are excluded from this survey, as they are all, more or less, to be considered as senile cataracts, at least as far as their clinical manifestations and operative management are concerned. The factors of immaturity, constitutional disease, refraction error, and capsular anomalies which they present, are problems which confront us, quite similarly, in the senile forms. The lens in high myopia forms a borderland type, and should be considered in passing as far as it affects children or young adults.

It is rather striking that the operation of juvenile forms of cataract, with the not invariable exception of the traumatic variety, is a comparatively recent development in ophthalmic surgery. Congenital cataract especially, was in former days a *noli me tangere* for many, as it still is for some, surgeons. The introduction of intracapsular and anterior chamber irrigation has greatly simplified our task in this respect. It offers valuable aid in the removal of opaque lens masses through a small or linear incision, thus removing at one and the same time two prolific sources of danger to the eye

and of operative failure, namely, irritation by retained lens-masses, and escape of vitreous through a corneal flap incision.

Leaving the traumatic cataracts on one side, we may state some broad generalizations as to the determining factors in all the juvenile forms. Let us take up, first, the question of what we expect to accomplish, the possible improvement in vision, appearance, and consequent social and industrial benefit to the patient, and, then, the method or methods by which we may expect to accomplish our object.

The prognosis *quoad visum* is perhaps of even greater practical importance to the child or young adult than it is to the aged. The restoration of sight in congenital cataract means the possibility of education (collegiate or industrial) and eventually of more or less complete self-support. The practical importance of this consideration can hardly be exaggerated, and is rendered still more striking if we stop to consider the long probable life-period of these patients as compared with the remaining years in senile cataract. The economic significance both to the individual and to the State is apparent. In the case of young adults, too, the economic importance of removing even unilateral cataract is shown by the difficulty experienced by these subjects in getting remunerative employment in competition with individuals of normal appearance, leaving out of the question, for the present, the factors of enlarged visual field, stereoscopic vision, and its quantitative value for accurate short-range eye-work. The æsthetic question is to a certain extent implicit in the economic problem. Many patients with unilateral cataract are quite satisfied if we can free them from the disfigurement of one "white eye," and are content with a prospect of improvement, if any, in the vision of the diseased eye, if we can assure them that its fellow will not be affected injuriously by the operation for cataract. The æsthetic question enters also, as we shall see, into the question of means as well as that of ends to be gained.

In many, if not in all, forms of atypical cataract we may take it for granted that we have to deal with a more or less unsound eye. For our prognosis this means that we must be extremely guarded in our promises to the patient, as well as in our own hopes as to functional improvement which is to follow intervention. Fortunately for both, there is little to be lost and much to be gained, as the failure to improve the vision merely leaves matters *in statu quo* as far as function is concerned, while the appearance of the patient may be greatly improved. Again, even if we have but poor vision as an operative result, this means much more for the young patient, who has never seen, than for the aged, who had good sight before the development of senile cataract. 20/100 in the latter case would be, practically, a partial failure, while in the case of the young it would mean practical success.

The æsthetic side of the question imposes on us two main desiderata, the complete removal from the pupillary area of the opaque lens matter, and, hardly less important, the avoidance of all operative disfigurement.

In this connection I wish to refer for a moment to iridectomy and its purely cosmetic features. In senile cataract removal of part of the iris causes less apparent disfigurement than in the young. As complete removal of the lens is usually possible, the coloboma is not very strikingly evident. Again, the danger of iris prolapse is so well worth considering that we may take the iridectomy as by far the lesser of two evils. In juvenile cataract there is less danger of iris prolapse. Atony or rigidity of the iris, the two prolific causes of prolapse, are not present to anything like the same degree as in old age, and there is less *vis a tergo* in the form of intraocular pressure to cause incarceration or extrusion.

In children and young adults an iridectomy is a positive blemish. As we may not succeed, especially in zonular forms, in removing all opaque matter, the less of the lens surface exposed to view the better, for this particular purpose. We want, above all, to get a clear, round, black pupil, and only considerations of safety for the eye should induce us to sacrifice this cosmetic improvement by the addition of an operative coloboma. The reasons for performing the iridectomy have been mainly a fear of adhesion of the iris to the lips of the wound or of prolapse during healing. I believe that this danger can be averted by the choice of a suitable operative procedure. This choice is determined largely by the consideration that up to the age of 25 or 30 years we can count on the necessity of removing only soft masses, and possibly a very small nucleus, which is not of dense consistency, in the zonular forms. These juvenile or young adult cataracts are soft—that is, there is no nucleus, or but a very small one, which is never very consistent. As to the age at which the nucleus develops, there is some difference of opinion. Up to the age of 25 years one is generally safe with a small keratome incision. After that, one must be prepared for a nucleus, even if small. The presence of a nucleus may sometimes be demonstrated by oblique illumination and the elicitation of Hess' nuclear reflex, but I have failed in this more than once. I have the impression from my own cases that the development of the nucleus takes place somewhat later in women than in men, so that in a woman of 30 years one might expect a completely soft cataract. Capsular changes are common, as might be expected from the traumatic and inflammatory factors in the causation of this form of cataract, and for the same reason adhesions of the iris in the form of posterior, more rarely of anterior, synechiæ as well, may be encountered.

Having to deal almost invariably with soft lens masses we find it possible to dispense entirely with the flap incision, which, as we well know from our experience with senile cataract, may easily give exit, not only to the lens, but to the iris and vitreous as well.

The comparatively rapid healing of a linear section is, of course, an added advantage in children and young adults, who cannot be trusted to maintain the philosophic attitude of uncomplaining quiescence that we expect and usually find in the aged. Even starch bandages and sleeve-pinning do not relieve us of apprehension as to possible accidents in the post-operative stage, and every day by which this stage is shortened means a greater chance of success. It is not only during operation, but after it, that the flap incision, with its tendency to gape, is a source of danger. With the linear incision we have nothing to fear on this score. Two other malign possibilities, that of infection and of iris adhesion (prolapse being excluded), while not entirely eliminated, are at least greatly reduced.

The only valid—or apparently valid—objection which has been raised against the linear incision with a keratome is the supposed necessity for performing an iridectomy to avoid adhesion. If we can dispense with iridectomy, there is nothing to be gained and much to be risked by flap operation. I believe that adhesion can be prevented almost always in the linear operation, and that if iridectomy should be necessary, it can be performed through a keratome incision at the limbus quite as well as after flap section.

Our main reliance for prevention of iris incarceration lies in the rapid and definite restoration of the anterior chamber and in a position of the corneal section as far as possible from the pupillary margin. The first of these two points is gained most effectually by a linear incision; the second, by full atropine mydriasis kept up for some time after operation

It is another drawback to the flap incision that this mydriasis predisposes to iris incarceration and to the even more serious complication of iris prolapse and loss of vitreous, both of which accidents are practically excluded by the keratome incision. It is this instinctive fear of loss of vitreous and prolapse of iris in the flap operation of juvenile cataract which leads some surgeons to operate with an imperfectly dilated pupil. An attempt is made to enlarge the field by means of an iridectomy, but as we often have to deal, as noted above, with a diseased eye, we may find that the iris is partially adherent and that it bleeds freely when cut. The effused blood obscures the field, mingles with the lens masses if capsulotomy has been performed, and is not easily washed out. All these incidental complications are avoided if we can eliminate the iridectomy, and our chances of a clear pupillary field are immeasurably increased.

Again, not only capsular after-cataract but the retention of cortical masses is minimized in proportion to the thoroughness of irrigation which in soft cataracts is our main reliance for the removal of opaque lens substance, and irrigation can be employed much more thoroughly and deliberately after a linear section than with a flap wound, as we are not hurried by the apprehension of losing vitreous. As we must count on partially, if not completely, fluid vitreous in many forms of juvenile cataract, and on a defective zonule, the danger of vitreous prolapse is much more imminent and common than it is in senile cataracts, where it forms, or should form, the exceptional complication. A procedure which will free us from anxiety as to this accident must have another point placed to its credit.

We cannot count on children to be docile and to assist us in the operation. Even if free, they may not hold still. A general anæsthetic is required, as a rule, instead of exceptionally, as in the old operation. Here again, we have an added reason of great cogency for avoiding a flap incision. Restlessness, even in narcosis, straining or vomiting, add immeasurably to the dangers of the operation, both as to prolapse and infection, while a linear incision safeguards the eye to a very large extent. Even if the operation has to be interrupted, the conditions are very much more favourable where we may count on almost immediate restoration of the anterior chamber and a rapid healing of the operative wound. Finally, the probability of having to do with a thickened capsule, and with the necessity of extracting it with forceps, or if this should be found impossible, of cutting through it in several directions with de Wecker's scissors, is a last point in favour of the linear, and against the flap, incision. I have seen operations left uncompleted (and wisely so) for a fear of getting prolapse of vitreous in the attempt to cut a dense capsular band in the latter stages of flap extraction of congenital cataracts. It is true that such thick capsular remnants can be cut at a subsequent operation without fear of vitreous prolapse, but if this can be done at once, it enables us to get out all opaque lens masses by irrigation, and this can never be done later on. I may refer in passing to the evident consideration that an intact iris, a linear section as such and its position in the cornea some distance from the limbus, all tend to prevent escape of any large amount of vitreous, and that under these circumstances our manipulation of the capsule forceps or de Wecker's scissors can be deliberate and untrammelled—and correspondingly effectual.

It is not necessary to go into minute details of *technique* in this connection. The essentials of operative manipulation may be summed up quite briefly.—General anæsthesia for children and for those young adults whom we cannot count on from the experience of previous minor procedures about the eye to be absolutely tractable and passive. Intelligent patients may be put at rest,

physically and mentally, by the administration of a hypodermic injection of morphine, 1/4 grain, and hyoscine, 1/150 grain, an hour before operation. In case of any contra-indication to these two procedures, we have a valuable substitute in the subconjunctival injection of a weak (1/2%—2%) solution of cocaine, as practised with excellent results by Koller.* It is the only means by which, for instance, an absolutely painless iridectomy can be secured, and deserves wider general adoption than it has yet attained.

Full dilatation of the pupil is essential. In cases of posterior synechiæ this is even more important, and every means should be used before operation to break up existing adhesions. Failing this, an attempt may be made to free the iris by means of the cystotome or even de Wecker's scissors, preferably before capsulotomy. The site of the corneal incision will depend to some extent on the possible degree of pupillary dilatation obtainable before operation. I like to make the section about one-half of the way from the limbus to the horizontal meridian of the cornea, using a medium-sized angular keratome, and using up only part of the width of the blade. This obviates carrying the point well down towards the opposite iris angle, another reason for dilating the pupil fully and thus avoiding injury to the iris. Capsulotomy should be free and peripheral, and if the capsule is thickened, an attempt should be made to exsect this portion and to extract it with capsule forceps. Irrigation is then employed, the tip of a small glass pipette being applied close behind the distal wound lip and a stream of normal saline solution at body temperature allowed to flow with some force from a rubber bulb through the anterior chamber. The exit of cortical masses is greatly aided by introducing a narrow spatula or iris repositor within the lips of the wound and making gentle pressure just sufficient to cause it to gape slightly. The tip of the irrigator and the spatula may have to be carried from one angle of the wound to the other and the direction of the irrigating stream changed in order to get at various masses in the anterior chamber or within the capsule. This manipulation should be kept up until the pupillary area is perfectly free, or until we have convinced ourselves that irrigation alone will bring out nothing more. Patience and lightness of touch are necessary, but we do not hesitate to keep up the irrigation much longer than we would dare to do in the case of senile cataract, for the reasons already detailed. The restoration of the anterior chamber may be aided by continuing the irrigation after removal of the spatula from the wound. A drop of 2 or 3 per cent. atropine solution should be instilled, and the eye bandaged carefully. A mask is then adjusted, but the unoperated eye should not be covered up.

My experience with this method has been uniformly successful and gratifying. In only one case that I can recall was there any complication on the part of the iris. Full mydriasis had not been effected, and there was a small linear adhesion of the iris to the inner corneal edge of the keratome incision, which could be detected only by careful examination. Under ordinary conditions it was not apparent.

I am aware that there is nothing original about the procedure I have detailed. I know of a number of surgeons who practise it uniformly and skilfully, but I also know of others who keep to the flap extraction in spite of what I consider serious objections to it, and others, again, who being in doubt as to what form of operation offers most chances of success, avoid as far as possible, all operative intervention in cases of atypical cataract.

Zonular or Lamellar Cataract.—This form presents a firm and dense but small nucleus and some of the layers may be of high consistency. A single needling is rarely adequate to cause opacification and homogeneity

*See THE OPHTHALMOSCOPE, Vol. II, 1904, p. 356.

sufficient to allow extraction by flap incision, and absorption is generally slow and often incomplete. The nucleus has often been allowed to remain in the anterior chamber and gradually to disintegrate. It seems to me a much more satisfactory procedure to apply the linear extraction to this class of cases, as well as to purely soft cataract, making a somewhat larger keratome incision about half way between the limbus and the centre of the pupil, breaking up the anterior layers with the cystotome, and irrigating gently but persistently.

Needling operations form a routine procedure with many operators, and good results are often obtained. However, a single needling may have no apparent effect, even in an obviously soft cataract. The necessity for several operations is not only an inconvenience, but an actual danger in young patients, as they are repeatedly subjected to the risk of intra-ocular infection, disturbance of the bandage, and consequent interference with prompt healing, and the chance of actual injury to the operated eye during the healing process. Again, the presence of swollen lens masses lying against the iris or partially filling the anterior chamber, is by no means a consummation to be desired. I merely refer in passing to the comparative frequency of iritic and cyclitic inflammation and the occasional causation of acute glaucoma in these cases.

SMITH'S CATARACT OPERATION.*

BY

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WHEN Major Smith's first American paper appeared in the *Archives of Ophthalmology*¹ I became interested in his operation, and after reading the paper, performed twenty-two operations as nearly according to his directions as possible, and, like many others who have tried the operation without having seen it performed by one competent to demonstrate its *technique*, I felt called upon to condemn it²; but on reading Knapp's paper after his return from Jullundur³; and later having the privilege through his courtesy of meeting Smith in New York and hearing him explain the *technique*, and of seeing him make four operations, I came home with a better conception of the steps and possibilities of delivery of the lens in the capsule by external manipulation than I had before.

An invitation from Smith to visit him in India was eagerly accepted, and as soon as arrangements could be made, the long journey was undertaken with Derrick T. Vail of Cincinnati, whom it was my privilege to have as my companion. Vail has already contributed an interesting paper on the subject of the Smith operation to THE OPHTHALMOSCOPE.⁴

We arrived at Bombay on September 27th, 1909; two days later we were at Jullundur, the Mecca of cataracts in India. Clark, of Columbus, Ohio, had preceded us by two weeks, and we found him at work in the old hospital. His stay, however, was necessarily short, and we reluctantly bade him "good-bye." He has, however, favoured the profession with several papers on this subject.⁵

*Read at the Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology at Cincinnati, Ohio, U.S.A., September, 1910.

1. Smith.—*Arch. of Ophth.*, Vol. XXXIV, No. 6, 1905, p. 601.

2. Greene.—*Trans. Am. Acad. of Ophth. and Oto-Laryn.*, 1906, p. 70.

3. Knapp.—*Arch. of Ophth.*, Vol. XXXVII, No. 1, Jan., 1908.

4. Vail.—THE OPHTHALMOSCOPE, Vol. VIII, No. 6, p. 400, June, 1910.

5. Clark.—*Arch. of Ophth.*, Vol. XXXIX, No. 1, Jan., 1910.

Clark.—*Ophth. Record*, Vol. XIX, No. 2, p. 102, Feb., 1910.

It is my intention to be very brief in my remarks concerning the Smith operation this afternoon, in order to give plenty of time for Dr. Vail to demonstrate the steps of the operation by lantern slides. Perhaps I should not have said anything, but the title of Dr. Vail's paper indicates that he seems to think some one has strayed far from the fold and changed some of the instruments and omitted some of the *technique* of the Smith operation, as we saw and did it at Jullundur in September, October, and November, 1909. I know from correspondence and conversation with him that in naming his paper "The Unmodified Smith Operation," he had in mind certain modifications of instruments and *technique* which have grown into favour at Dayton. These, however, amount to very little and in no way depart from the principles Smith has laid down for delivery of the lens in the capsule. To my mind, however, the Smith operation is far too much of a surgical procedure to be encompassed in a few iron-clad rules of manipulation and specially constructed instruments to be used according to certain definite rules.

The operation is built on broader lines and is a method which covers the whole field of cataract operations, except the class of cases referred to in the text. Some of the best minds in ophthalmology in the past have wrestled with the problem of intra-capsular delivery of the lens. The multitude of instruments they have left behind and the varieties of *technique* they have employed all go to show that the problem of successfully delivering the lens in the capsule is not a simple one; on the contrary, *it is very complicated*.

If all eyeballs were of the same size, if the cornea always measured 11 millimetres or more in its horizontal diameter, if the lens in the capsule always measured 9 millimetres (about the average), if the tension of eyeballs was always the same, if the cataractous lens was always hard or always soft, if the section could always be placed in the same mathematical plane and always be properly proportioned to the size of the cornea and the body which is to pass through it, then I would agree that it is a simple operation, but I am convinced that along these and some other lines the difference between American and Indian patients is so great that even Smith himself could not duplicate his Indian statistics on American patients. These remarks are not intended in any way to condemn or to detract from the operation, but are rather intended to help define its scope and limitations. So much for this phase of the subject which has received more attention than it was my purpose to give it. I had rather intended to refer to a few changes in instruments and in Smith's *technique* in relation to *toilette* which I have made. I may add that all of these changes were suggested to him or were made under his observation.

When I met Smith in New York, in 1908, he used a small brass speculum and lid hook, and a small brass delivery hook, of about the dimensions of an ordinary strabismus hook, and a double-ended brass spatula, each end being 8 by 10 millimetres, which, while operating, he held in reserve perpendicular to the lower inner corneal border of the eye operated on. If he was not able to effect the delivery of the lens by manipulations with the hook in the right hand on the lower edge of the cornea, he would make gentle pressure with the tip of the spatula just inside or outside the sclero-corneal border, beside the point of the hook, which was quite an aid to delivery in certain cases, and the instrument was of even greater service if vitreous presented or was being lost, but I could not see the reason for having both ends of the same size. I suggested that it would be an improvement to reduce the width of one end from 8 to 4 millimetres, and I had one made for my own use, which was an improvement, in my judgment (fig. 1).

Sometimes, when vitreous presents or escapes and it is necessary for delivery in the capsule to hold a flat smooth surface between the scleral lip of the incision and the lens, to take off pressure from the vitreous while the lens is being pushed up by making pressure on the lower border of the cornea, or if it becomes necessary to pass an instrument down between the lens and the



Fig. 1.

hyaloid as far as the posterior pole of the lens to support the vitreous, this narrow end will go in easier and take up less room, but its bearing surface is smaller and it does not answer as well as the wide end for this particular purpose. Another advantage is that if the operator has not a steady hand, he can use the narrow end for pressure across the lower border of the cornea or on the posterior flap by resting his finger tips on the malar bone.

I find this instrument all right in America, where cataracts are not so abundant, but in India, where large numbers had to be operated rapidly every day, *the double-ended spatula was better*, because if one end touched a surface which had not been sterilized, it could be quickly turned and the sterile end used. Smith is very particular about this and all other points relating to clean instruments and the field of operation.

I have lately thought that the necessary pressure could be better concentrated at any particular point on the lower border of the cornea or out on the sclera by a probe-pointed instrument (fig.2) then by the flat end of the spatula, which is sharper on the edge, broader, and covers a wider surface in one direction. This probe point, however, is only on trial, and I am not certain that it has any advantages over the flat end.

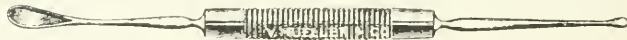


Fig. 2.

There is a stage in the delivery of almost every cataract which is delivered straight just after it is dislocated and is standing upright in the section, and matters are at a standstill, where one of two manipulations is necessary to deliver it. Dr. Vail will tell you that in the unmodified operation you should dislocate and deliver the lens with only one instrument, *the so-called smaller strabismus hook*. I have seen Smith deliver many cataracts in this way, those presenting in the section with the upper edge first, and I have delivered many with this single instrument myself, but I think in more than a majority of cases in my experience at Jullundur, both the hook and spatula were used together, especially if the tension of the eye was not full normal. 71 per cent. of the lenses were delivered straight.

Under date of May 18th, 1910, Major Peck, I.M.S., who is Smith's successor at Jullundur, wrote to me as follows :

"I have only had four Smith's extractions returned with no sight. In all of them I was unable to get a view of the fundus, due to vitreous opacity. I did six hundred cataracts between January 1 and April 30, 1910, the last two-thirds by Smith's method, and had very good results, very few prolapses of iris, thanks to your method of replacing it."

I personally know that Peck was not favourable to the Smith operation before coming to Jullundur. But in his case, (as in that of Major Birdwood,

who had performed 311 operations and severely criticised the operation, when he came to Jullundur and saw Smith operate, and operated under his direction), he became a convert to the method.

I have not used the 1:2000 bichloride solution from a glass container suspended five feet above the operating table as Dr. Vail will describe to you, because I have not felt the need of such treatment for the normal conjunctiva, which is the rule with us. The Ziegler flushing bottle has answered my purpose, using normal salt solution.

I have examined six hundred men above sixty years of age in my clinic at the National Military Home, near this city, in whom the average horizontal diameter of the cornea was about $11\frac{3}{4}$ millimetres. The average diameter of a number of lenses just removed from this same class of men has averaged in the capsule about $8\frac{3}{4}$ mm. At Jullundur the average horizontal diameter of the cornea was 12 mm, and a large number of lenses 9 mm., measured roughly with a small millimetre rule.

Colonel Maynard, I.M.S., Calcutta (*Ind. Med. Gazette*) has reported measurements in sixty-one eyes with cataract which show that the average horizontal diameter of the cornea was 12.05 mm. and of the lens 9 mm. when just removed from the eye. The lens seems not to vary as much in diameter as the cornea. It is evident from these measurements that if a cornea does not have a horizontal diameter above $9\frac{1}{2}$ mm. the lens would be pinched and squeezed to a dangerous degree in expressing it. I believe a knowledge of these proportions and relationship of one part of the eye to the other has more to do indirectly with the success or failure of the operation than all other causes combined. In other words, "*L'opération de la cataracte, c'est la section.*"—Terrien.

A marked peculiarity of the Indian eye is that the corneal wound in nearly all cases separates the interior lip, falling downward and backward; this exposes the iris up to its insertion, and it can be replaced and smoothed out in ways that could not be followed with our people, who are better fed, have higher average blood pressure and higher average normal tension of the eyes, and more orbital fat to keep the eye full and prominent.

After leaving India I thought of Smith's original way of replacing the iris with the so-called strabismus hook, which was too large, and the improved way of replacing it with the flat end of the repositor which I thought could be improved. Therefore, I had the silver probe end of the repositor bent to a right angle with the shank 2 mm. from the end for the purpose of replacing the iris (fig. 3). I have been pleased with it, as have some others who have used it. With the patient looking high up and the operator standing on the right side and directly in front, and confining all efforts at replacements of the pillars of the iris to the iris itself, the hyaloid is not in danger of rupture and vitreous is seldom lost.

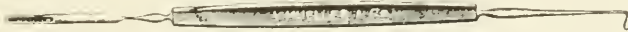


Fig. 3.

It is quite generally believed that Indians enjoy a degree of immunity from post-operative complications, to which they are entitled by reason of the simplicity of their lives. They live close to Nature, and have been called "children of Nature." They may, and perhaps do, enjoy some immunity from the germs to which their conjunctivæ have become immune from constant contact. A large proportion have trachoma, but if a new germ is introduced into the conjunctival sac, they are quickly infected, and I have seen as severe

cases of panophthalmitis in Jullundur as I have ever seen at home. Those who insist on these degrees of immunity forget the other enemies which attack the natives by day and by night, and make them unhealthy and cachectic: dysentery, plague, and malarial fevers are their worst enemies. It was shown at the Bombay Congress, February, 1909, by Lord Minto that there had been one hundred million cases of malarial fever in 1908, with two million deaths. From this standpoint, the Indian is not a good patient.

It was the plan at Jullundur to keep patients quiet in bed with the eyes well bandaged for several days, but the want of nurses made close supervision over them impossible. Often in going through the wards of the hospital the morning after the operation, many of the patients would be found sitting up in bed with a sheet or blanket over their heads, the bandage badly disarranged, and in many cases removed.

Elschnig¹ has made the following statement, which I think should be corrected, as it is manifestly unfair to the operation, and detracts from one of the most skilful manipulations of intra-capsular delivery. "I wish to add that in many cases of expression, the superior edge of the lens appears first in the wound. In others, however, the lens is dislocated upon its horizontal axis, so that the inferior edge is first delivered, while the posterior surface of the lens looks forward. The operator is not able to effect either the one or the other delivery at will." In our experience at Jullundur, twenty-nine per cent. of all lenses were turned over. They were diagnosed as suitable for this method of delivery: in fact, every lens with soft "mushey" or milky cortex and a small nucleus will, if *properly manipulated*, take the hour-glass form in delivery, and can be turned over. A full-size sclerosed lens will not turn for want of room.

In this method of delivery, as soon as the lens is moved well out of its bed and is standing upright in the section and inclines to fall forward, the operator should fold the cornea under it and not touch the capsule with the point of the hook. This is not usually difficult, but if he fails to deliver the cataract with the single hook he should make gentle pressure backward with the small end of the spatula, at the sclero-corneal junction below, and he should be careful to keep the lens pressed well back against the posterior lip of the incision to prevent vitreous escape. He should also be careful at this point to use only the concavity of the hook to roll or to draw the presenting lens edgewise out through the incision. The point should be held well up where it will do no harm to the capsule. If the capsule ruptures during these manipulations, it usually results from one of three or four causes. First, the section is too small; second, the cataract has ripened so rapidly and the capsule is so stretched, that it will not stand the manipulation of delivery; third, by the point of the hook touching the capsule in the effort to fold the cornea under the lens. If the cataract has been correctly diagnosed and has been made to turn over ("tumblers" Smith calls them) and the capsule ruptures, it usually hangs out of the wound, from which it can be easily extracted by a wide-bladed forceps; but if it ruptures when the lens is coming straight through the wound, the capsule usually recedes, and it is seldom possible to catch it with forceps and to withdraw it. Smith treats such cases in the following way.—He introduces a pair of long curved iris forceps flat-wise and turns the point backward, opens the blade widely and grasps the capsule, and he generally succeeds in tearing a hole through it, and sometimes extracts it. A better way, I think, in this country, is to treat such cases by the ordinary discission method.

The *toilette* of the operation was very simple at Jullundur after the delivery

1. Elschnig.—*Ophthalmology*, Vol. VI, No. 3, April, 1910, p. 353.

of the lens. Smith would use the point of the small delivery hook to replace the iris if it had prolapsed into the angles of the wound, but the bulbous tip was too large to go well down into the angles; hence every prolapse was not freed, and we too often saw the tendency to drawing up of the pupil, which experience has taught me always results if the pillars of the iris are left entangled.

After-treatment of these cases has been more necessary in this country than in India, where the eyes were usually red and irritated for a few days, but made prompt recoveries. This was attributed to the strong bichloride solution, 1 to 2,000, used in every operation; but after returning home, and continuing the operation without the use of the bichloride, I observed about the same reaction. The eyes were redder and looked more irritated than after the regular operation and cleared up slower; while this condition is so often present, absence of pain during the healing is generally observed. *There can be no mistake about these patients not having much pain.*

After the regular operation, painful inflammatory complications are sometimes met with, and often jeopardise the eye from the severe inflammation itself or its results. After intracapsular extraction, a different picture is present, and different treatment is indicated. I do not know the pathological conditions present in a red eye, not painful, seldom chemotic, with iris and cornea clear, but with more or less opacity of the vitreous, which under other conditions would not clear up and vision improve say from 20/100 or 20/70 to normal in a few weeks, but I do know that it is possible for it to occur after this operation, having seen it many times.

It is not my intention even to suggest that complications, severe and sometimes fatal to the future integrity of the eye, may not follow the Smith operation; on the contrary, they do among our gouty and rheumatic patients, but they are seldom of the painful inflammatory type observed after the capsulotomy method, and I have been impressed over and over again that the difference in these reactions depends largely on the location and character of the inflammation. Painful inflammatory complications in the anterior segment of the globe are rare after intra-capsular operation, but opacity of the vitreous, etc., is more often seen unless the delivery has been uneventful.

If complications arise, longer confinement in bed is necessary, free purgation is indicated; holocain and large doses of one of the preparations of salicylic acid and colchicum are indicated, and dionin, 10°/o solution or stronger, or still better, dusting a small quantity on the cornea, have yielded the best results in my hands. The mercurial treatment, so highly thought of by the English profession, I have not tried to any extent, but the testimony of so many competent observers in its favor should entitle it to fair trial.

Probably, the most important contributing factor to the success of a cataract operation is the physical condition of the patient. Many men who discuss this subject seem to think the question of the future of the cataract operation is settled. So far as the old operation is concerned, this may be true; it having been extensively practised since 1753, now 157 years, it has probably reached its limit of improvement in *technique* and visual results. But there are men who regard the future of the cataract operation as still an open question, and with the hope and possibility of attaining to the ideal operation, are not satisfied to stop and to throw up their hands. They believe that Major Smith has offered us a reasonably safe and practical series of manipulations¹ by which the lens can be delivered in the capsule with a sufficiently high degree of success to constitute a new operation. I happen to have had excellent facilities for acquiring some skill and *technique* in performing his operation at home; and

1. Smith.—The Treatment of Cataract, Calcutta, 1910.

to gain further proficiency in the method, made the journey to India, where I operated about 400 times under Smith's direct supervision, which I consider necessary to success with the method.

It is not worth while to say anything more about the *technique* of the Smith operation, after Dr. Vail's thorough exposition of the subject. I believe, however, I should state that I do not regard the operation as suitable for all cases of cataract. I do not employ it in all cases myself, and would not advise others to do so.

I think the great field of usefulness of the Smith operation will ultimately be found in the treatment of immature cataract. This, I think, is self-evident, but much can be said in its favour in the treatment of other kinds of cataract, in which it is possible to make a selection of cases which will favor the operation and the statistics of the operator. One for example: if you have a cornea with a horizontal diameter of 11 mm. or more, and a sufficient section you can express the lens in the capsule with ease. In the chapter I am writing for Wood's *Ophthalmic Operations*, I fully discuss the section and the corneal-lens measurements just referred to. *Smooth and easy delivery of the lens is the "sine qua non" of success in the operation.* As has already been stated, it is impossible to crowd a large body through a small opening without undue traumatism and subsequent reaction. The section which it is possible to obtain with safety, in a $9\frac{1}{2}$ mm. cornea, is too small for the average lens in the capsule to pass through; therefore, this horizontal measurement of the cornea is a contra-indication for the operation.

I am sorry that the opportunity for trying the value of a preliminary iridectomy on a large scale could not have been tested in India, but since coming home I am making a test of a hundred cases. The indications for making a preliminary iridectomy are nowhere more marked than in intra-capsular extraction. Theoretically, I believe in it, and practical experience so far has justified the belief.

Dr. Reeve (of Toronto) has referred to the twenty-three cases of cataract operated upon by Major Smith at Bombay in February, 1909¹, which were reported with comments on the operation by Major Kilkelly. While in Jullundur in November, 1909, Major Elliot, of Madras, first called our attention to the forthcoming publication of these cases, so that we were familiar with them months in advance. They are reported as follows:

No. of Cases.	Vision.
1	6/15
2	6/20
7	6/30
3	6/40
4	6/60
5	Fingers from 10 to 18 ft.
1	Moving bodies

To believe that Major Smith could operate on twenty-three cases of cataract and have the uniformly bad results just shown, is asking too much of men who have spent six weeks or more with him, and have seen the high average results which he had, and which we ourselves have had under his direction. The fact that Major Smith performed these operations presupposes they were properly made, and he has so stated², and with fair attention and

1. Kilkelly.—*Indian Medical Gazette*, May, 1910, p. 178.

2. Smith.—*Indian Medical Gazette*, July, 1910, p. 249.

proper treatment the cases should have done as well as the average of cases at Jullundur¹ and ². Kilkelly has tried to prove too much against the operation. If we grant that there is little time for testing visual results at Smith's clinic, it is also true that experienced operators who have spent long enough there to get a line on the behaviour of cases, and the complications sometimes met with after the operation, can know with reasonable certainty *a good eye when they see one*. Without knowing exactly the lens required and the amount of vision obtainable, one thing is certain, a very high percentage recover promptly from the operation, and visual results must be good. Kilkelly's statistics, except under the conditions named later, cannot be accepted by any one at all familiar with the average results obtained at Jullundur. The condition is that contributory negligence, wittingly or unwittingly given the cases, was responsible for their poor showing.

No other Indian operator with whose writings and statistics I am familiar, *even although not favourable to the operation*, has ever presented such an array of statistics against it. I myself, without ever having seen the operation performed by anyone, and with nothing more than Smith's paper³ to guide me, made 22 operations which were reported in the *Transactions* of this Academy for 1906, p. 70. This work of a novice is so much better in visual results than that reported by Kilkelly, and as the number of operations is practically the same in each case, it may be of interest to compare them. He has reported that vision in 17 of the cases averaged 13/68, slightly better than one-fifth of normal. Vision in five cases equalled counting figures from 10 ft. to 18 ft., and in one vision only equalled moving bodies.

Of my 22 operations⁴, 15 were given glasses; these had an average vision of *plus* 4/10, or better than 2/5, practically one-half of normal vision. Of the other seven cases, one died of hypostatic pneumonia on the third day; one lost sight from fulminating glaucoma on the ninth day; one had vision equal to P. L. from occlusion and seclusion of the pupil: an iridectomy would have improved vision in this case; one had P. L. from thick capsule, which a discission would have benefited; and three were not tested in time for the report.

A later report⁵ of the results of 75 operations which I reported to the section of Ophthalmology of the American Medical Association makes a very much better showing. An extract of this paper appeared in *The Indian Medical Gazette*, May, 1910. Most of these operations were performed in the National Military Home Hospital under Government Supervision.

Among the nervous and erratic patients one so often encounters in America, I prefer the Fisher lid elevator (*see* Fig. 4) to any speculum with which I am

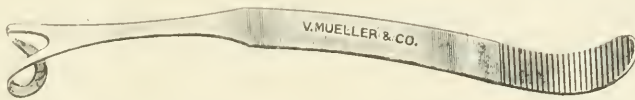


Fig. 4.

1. Smith.—*Arch. of Ophth.*, Vol. XXXIV, p. 602.
2. Lister.—*Trans. Bombay Med. Cong.*, February, 1909, and *Arch. of Ophthal.*, Vol. XXXIX, No. 1, p. 1.
3. Smith.—*Arch. of Ophthal.*, Vol. 34, p. 601.
4. Greene.—Extraction of Cataract within the Capsule by External Manipulation, the so-called Indian Method. *Trans. Am. Acad. Ophth. and Oto-Laryngology*, 1906, p. 70.
5. Greene.—Experience in the Expression of Cataract in the Capsule by the Smith Method. *Trans. Section Ophth. Am. Med. Assn.*, 1909, p. 177.

acquainted, but if the speculum is used, I do not know of a simpler or better one than that used at Jullundur (*see* Fig. 5).

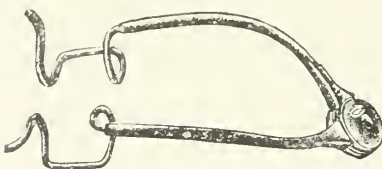


Fig. 5.

The large lid hook does not require any special description, and its use has been so often described that reference to it is all that is necessary in this connection (*see* Fig. 6).

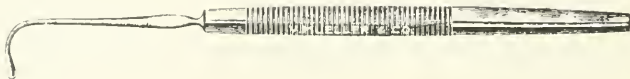


Fig. 6.

This small delivery hook in use at Jullundur closely resembled a strabismus hook, but the point was more bulbous, and was made of coin silver (*see* Fig. 7).

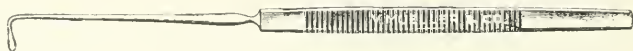


Fig. 7.

Iron and brass make equally good points, but a nickel-plated point is an abomination. It will slip so easily on the cornea, that delivery must be accomplished by pressure, and not by the delicate manipulations which are so essential to high class results and low percentage of accidents. The point should have grit enough not to slip, and yet should be smooth enough not to abraid the epithelium of the cornea. Silver possesses those qualities, and is to be preferred. I found the size of the bent part or hook of the instrument (*see* Fig. 7) varied considerably among the instruments we used at Jullundur, and that among patients in whom trachoma had left so many contracted fornices, the manipulations in the *accouchement* of the lens were easier carried out with a short than with a long hook.

In regard to the effect of cocaine on the cornea, I wish to state that I have a book on file in the library of the surgeon's office at the Soldiers' Home, kept by my assistants, in which are recorded all the operations I have performed in the Hospital from my appointment on the staff to the present time. The first time I ever used cocaine, December 10, 1884, I had a collapse or umbilication of the cornea, and I had a note made of the fact that "the conditions of the cornea might be due to the use of cocaine." I think this is one of the original observations on the subject.

I appreciate all Dr. Edward Jackson has said in regard to the operation. He has honoured me with a visit to my clinics, and has seen the operation performed there and has examined many operated cases, so that he is in a position to speak of intracapsular extraction with some knowledge of the subject. I do not think every man should attempt it, and no man should follow the method unless he has had great experience in cataract operating, which he

cannot gain in less than one to two hundred operations. This does not mean that many of the men in this room could not become as expert as Smith himself if they had the same number of operations to perform, but it does mean that cataract is so comparatively rare in America that few men have the opportunity to become proficient in the operation or of keeping in practice, after having learned to perform it.

Therefore, I will say again, that no man should attempt this operation unless he has mastered its details and has had a large operating experience under the guidance of one capable of demonstrating its *technique*, its indications, and contra-indications, and perhaps of as great importance as these, have had the care and after-treatment of a large number of cases.

CONCERNING CONGENITAL CATARACT: COMMENTS UPON SIXTY-SIX CASES IN THE OHIO STATE SCHOOL FOR THE BLIND.*

BY

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THE relative infrequency in private practice of cataract of the congenital type as compared with cases in adult life and the senile form should be sufficient ground for this presentation. My own private cases have been few—a bare half dozen operated on. The opportunity to observe and to study these cases among the pupils at the Ohio State School for the Blind opened up to me an interesting field in which I had had little opportunity elsewhere. It is not my intention to deal with the many phases of lens pathology, for there are others much better qualified by research work to speak upon these points, but to bring to your attention some phases which more particularly concern us as clinical observers.

In the period covered by my records of admissions, which date back fifteen years, there have been admitted to the school sixty-six cases of blindness due to congenital cataract—44 males and 22 females. This number seems sufficiently large to allow one to make some classifications and deductions that might be more than suggestive—that might be actually helpful to some whose experience with such cases may be comparatively limited.

As to the proportion showing consanguinity in these sixty-six cases, there are the following groups:—

- (a) Three brothers, with the history of a similar lesion in the mother.
- (b) Two sisters and one brother, and at home (not a pupil), an infant brother similarly afflicted.
- (c) One sister and one brother.
- (d) One sister and one brother.
- (e) Two brothers.
- (f) Two brothers.
- (g) Two cousins.

Imperfection in records render it probable that this list does not show all related cases in same family; *i.e.*, of brothers and sisters, but shows sixteen cases related.

* Read before the American Academy of Ophthalmology and Oto-laryngology, Cincinnati, Ohio, September 20, 1910.

In twenty-seven of the sixty-six admissions, operations had been performed on one or both eyes before admission to the school. Of those that entered with both eyes unoperated, twenty-two have since had operations at the school.

We can use these groups for purposes of comparing visual power :—

- (1) Visual rating of unoperated cases.
- (2) Visual rating of those operated before entrance, which, it may fairly be presumed, means operated at an average younger age than those
- (3) Operated after entrance to the school.

In these groups we tabulate eyes rather than patients. As can be expected, where opacity of media exists, where there is imperfect development of the neuroretinal tract—probably ametropia—nystagmus, squint, and more marked amblyopia of one eye are frequent. The wide variation in degree of visual acuity may be supported, therefore, in the same patient by a fair degree of vision in one eye, and bare P.L., or slightly better, in the other.

TABLE I.

Visual rating of cases of eyes unoperated :—20/20, none ; 20/30, none ; 20/40, none ; 20/50, two ; 20/70, none ; 20/100, two ; 20/200 to 10/200, nine ; less than 10/200 and better than poor form vision (ability to count fingers at variable distance), thirty-one ; perception of light only, thirty ; totally blind, one

Thus, of seventy-five eyes, in sixty-one the vision is less than 10/200. In thirty cases, or 40 per cent., it is no more than light perception. Taking those cases under 20/70 as ones able to read ordinary print, even with difficulty, we find but two eyes, or a total of 97 per cent., unable to read.

TABLE II.

Visual rating of cases of eyes operated before entrance to the school :—20/20, none ; 20/30, two ; 20/40, none ; 20/50, none ; 20/70, two ; 20/100, none ; 20/200 to 10/200, six ; less than 10/200 and better than poor form vision, twenty-nine ; perception of light only, thirteen ; totally blind, two.

In this table, covering fifty-five eyes, we find two cases rated at 20/70, and two cases with better vision, enabling eye to be used for reading ; thus over 92 per cent. were not able to read ordinary print.

TABLE III.

Visual rating of eyes operated after entrance to school :—20/20, one ; 20/30, one ; 20/40, five ; 20/50, one ; 20/70, one ; 20/100, six ; 20/200 to 10/200, eight ; less than 10/200 but better than poor form vision, seven ; perception of light only, two ; unknown, one.

In this list of thirty-three eyes, only two are as low as perception of light, while one is 20/70, and eight, or 25 per cent., have ability, with more or less difficulty, to read ordinary print.

TABLE IV.

Or making a group of cases where vision is 20/70, or better, we find of those cases with vision equal to

20/20, unoperated eyes, none ; operated before entrance, none ; operated after entrance, one.

20/30, unoperated eyes, none ; operated before entrance, two ; operated after entrance, one.

20/40, unoperated eyes, none ; operated before entrance, none ; operated after entrance, five.

20/50, unoperated eyes, two ; operated before entrance, none ; operated after entrance, one.

20/70, unoperated eyes, none ; operated before entrance, two ; operated after entrance, one.

TABLE V.

Visual rating of eyes operated at O.S.S.B. before and after operation.

- (1) Right, before, 20/100 ; after, 20/40 ; left, b. 20/100 ; a. 20/30.
- (2) R.b. fingers 10 ft. ; a. 20/200 ; L.b. fingers, 8 ft. ; a. 20/100.
- (3) L.b. fingers 2 ft. ; a. 20/100.
- (4) R.b. fingers, 4 ft. ; a. 20/100 ; L.b.p.l. ; a. 20/100.
- (5) R.b.p.l. : a. fingers.
- (6) R.b. fingers ; a. 20/200 ; l. same.
- (7) R.b. 6/200 ; a. same ; L.b. 12/200 ; a. 20/100.
- (8) L.b.p.l. : a. same.
- (9) R.b. fingers 10 ft. ; a. slt. imp. ; L.b. fingers 10 ft. ; a. slt. imp.
- (10) R.b. (?) ; a. 10/200 ; L.b. (?) ; a. 15/200.
- (11) R.b. 12/200 ; a. imp. (?)
- (12) R.b.p.l. ; a. poor f.v.
- (13) R.b.f.v. ; a. 10/000 ; L.b.f.v. ; a. 20/40.
- (14) R.b.p.l. ; a.f.v. (slt. imp.).
- (15) L.b.p.l. ; a.no imp.
- (16) R.b. fingers 3 ft. ; a. 20/70 ; L.b. fingers 3 ft. ; a. 20/40.
- (17) R.b. fingers 6 ft. ; a. 20/50 ; L.b. fingers 1½ ft. ; a. 20/20.
- (18) L.b.p.l. ; a. imp. good f.v.
- (19) R.b. 20/200 ; a. 20/40 ; L.b. 20/200 ; a. 20/40.
- (20) R.b. fingers 1 ft. ; a. 20/100.
- (21) L.b. fingers ; a. 20/100.
- (22) R.b.p.l. ; a.fingers.

This table is given to show what improvement was gained by operation in each case. In this there was wide variation, from ability to count fingers at 1½ ft. to 20/20.

We are told that we should operate early in congenital cataract to prevent amblyopia of high degree, and to stimulate retinal activity at an early age. I began my work on these cases having that in mind. There has been nothing in my personal experience to make me feel that the age of the patient at the time of operation had anything in particular to do with the final result obtained. The cases in which vision of 20/50 or better was obtained were, on the average, no younger than those in whom less acute vision was secured. It seems to me that the degree of vision secured when the pupillary space was freed from opacity depended upon conditions of the nerve and retina which obtained from the beginning. We recognise the eye showing congenital cataract as a pathological organ in which the lenticular opacity is simply a manifestation of altered or diseased conditions which obtained in the uvea and other parts of the eye, and partial microphthalmos may indicate how seriously the development of the eye has been affected. There are practical difficulties in operation and after treatment in the case of operation upon infants, and when complications arise, the patients' age seriously interferes with the procedures

the surgeon wishes to be carried out. So far as the ultimate vision is concerned, my experience is that an operation at six, eight, or ten, will give as good results as one at the age of one, two, or three years. I should now be governed by the degree of vision in the eye in determining the time for operating. If there was a dense opacity, involving the whole lens, and vision was p.l. only, I should operate one eye at least before the age of three years, and if a good result was obtained, the other also. If failure followed first operation, I should wait until the child was of age sufficient not to at least interfere with the measures to be carried out, even if not able to co-operate.

If the opacity was less extensive or dense, so that there was somewhat better than f.v., and the child thus enabled to get about and to use this vision in play, I would wait until the sixth or seventh year before operating. In institution work, where parents or friends may be more ready to criticise failures than in private work, I have usually chosen the poorer eye for first operation, and allowed the patient or pupil to decide as to whether the second eye was to be operated if no benefit was secured from first operation.

My next impression was in regard to iridectomy in this class of cases. The number in which this formed the procedure of choice was very small—two. Despite the fact that this retains the lens and accommodative power, the other conditions necessary to make it preferable—the transparent lens beyond the nucleus—have not often been found in the institution cases.

In the posterior polar, peri-nuclear, and zonular opacities, the anterior capsule does not present the problem which it does in the forms where the opacity involves the anterior capsule itself. In these latter cases, following discission and absorption of the lens, there is generally a marked tendency to proliferation of cells, with a resultant dense opaque membrane in the pupil. If, as in many of these, a calcareous pyramid is found attached to the capsule at the anterior pole of the lens, the result of discission is *nil* so far as vision is concerned, and such a membrane is exceedingly difficult to extract, or to lacerate in a way to leave a clear pupil. Now and then one finds absorption has gone on in a way that the dense membrane lies in what was the fossa patellaris with loose attachments, so that by keratome and capsule forceps it can be practically lifted from its place without traction—but such cases are rare. More often repeated attempts at laceration or extraction are made before the pupil is cleared. To obviate this possibility, and as the best method to secure a clear pupil, my aim in beginning operation is first to lacerate the capsule freely, a mydriatic having been previously used, and to break up not only the cortical but the nuclear portion of the lens as well, in the hope of getting fairly rapid swelling. As soon as the lens is sufficiently broken up, even if high tension has not supervened, linear extraction is made. After the first escape of softened cortex, it is usually possible to enter with capsule forceps and to remove the anterior capsule and, if present, the small calcareous pyramid, which, if left behind, results in the formation of a dense membrane. After this, the removal of the remainder of the softened lens material may be easily completed. In these cases the lens does not imbibe the aqueous as rapidly as in the zonular and posterior polar opacities. A later discission is not always needed when this has been the order of procedure, and if called for, the membrane has little resistance, and it is easy to secure a perfectly free pupil. In one patient with posterior polar and perinuclear opacity there was observed in both eyes the same incident. As the last of the softened lens material escaped from the corneal wound the hyaloid membrane ruptured, the tear being like that of a three-pointed star. No vitreous escaped, and the resultant vision was 20/30 respectively for the two eyes.

After securing a clear pupil by discission, in some cases the vision has depreciated—apparently from choroidal disease. Where reading vision has been secured, it is doubtful whether these eyes can stand as many hours in close work, even with refraction corrected, as do normal eyes, without some cases showing deterioration. In two eyes good reading vision has been lost through chorio-retinal disease arising later.

The introduction of the table of visual results in eyes operated before entrance may be misconstrued. It may be regarded as probable that of all eyes operated in infancy, those in whom the best visual results were obtained, *i.e.*, 20/40 to 20/20, would be the ones more apt never to enter the School for the Blind. Therefore, it may be presumed that in a table including all such operated cases there would be a larger percentage with a better visual result than this shows. But, granting this, I feel still convinced that such a complete table would not show a superiority in results over the table of those operated after beginning of school life. The difference, to my mind, would be more shown, especially in those of p.l. vision only, in mental conditions. A child deprived of vision for objects is hampered in mental growth as compared with one that has this ability. On the other hand, I am positive that in a large number of cases operated upon over five years of age there will be fewer total failures than in a similar number operated upon under that age.

THE CHOICE OF A CATARACT OPERATION.*

BY

W. A. FISHER, M.D.

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WHILE some definite method of performing a cataract operation may not be settled upon by all members of this Academy at the present meeting, it is, nevertheless, one of the most important questions awaiting our decision. The result which promises the best permanent vision is the one that should determine the kind of operation. The amount of time lost to the patient need not be considered if one operation offers better results than another. The one great and only consideration is vision. Before deciding upon any method of operating, it will be well to eliminate everything that has a tendency to give the patient poor vision. There are very many accidents that may be prevented, and all of these should, as far as possible, be eliminated. Colonel Smith has done much for the advancement of the intra-capsular cataract operation, but how many of us will perform the operation the way that he does? His *technique*, however, has so many advantages that all of us can profit by studying it. We have been taught to stand behind the patient while doing a cataract operation, and to instruct him to look down during the expulsion of the lens. This must be learned over again, and we are indebted to Smith for this great lesson. There is no reason why the Smith *technique* cannot be adopted by all of us, even though we persist in doing the old operation and cutting the capsule with the cystotome.

Preventable accidents.—The loss of vitreous occurring at the time the incision is made can usually be prevented by discarding all kinds of specula and holding the lid away from the eye by a lid retractor. The lid retractor

* Read at the Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology held at Cincinnati, Ohio, September, 1910.

devised by me more than five years ago, has been in use by many operators long enough to test its worth.*

Dr. Jamison, of Belfast, Ireland, writes (*Ophthalmic Record*, February, 1910), that during the winter of 1908 and 1909 he had the privilege of personally operating on six hundred and eighty cases in the Jullundur clinic, and loss of vitreous occurred in thirty-five cases out of this number. In nine of them it was due to the forcible squeezing of the lids and the consequent shooting-out of the lens and some vitreous on completing the corneal incision. This loss of vitreous in only about five per cent. of his cases is certainly good work, but nine of these cases occurred just as the incision was finished, and could have been prevented by proper control of the lids. This would reduce his percentage to loss of vitreous in about four per cent. Dr. D. W. Greene, one of Smith's aptest pupils, has discarded the speculum because of this loss of vitreous, and now relies upon the lid retractor in making his incision. If operators like Jamison and Greene cannot avoid the loss of vitreous because the patients squeeze the lids together at the time the incision is made, what can one expect of men who do only an occasional operation?

Faulty position of the eye.—Faulty position of the eye during the extraction of the lens is the cause of many preventable accidents. Dr. Greene says, and many bear him out in the statement, that if all the other complications occurring at the time of the operation were put together, they would not equal this one, namely, that of the patient looking down after the incision has been completed. M. Landesberg, a pupil of Pagenstecher (*Archives of Ophthalmology*, 1878) found much trouble in having his patients look down, although they were very willing to do so, but from fright, bashfulness, and other reasons, their eyes would remain in one position, upward. He therefore made his incision downward, which removed much of the annoyance. Eyes usually turn up after the incision is made, and remain in that position during the extraction, unless the patient is requested to look down. In my choice of an operation, I will describe the patient's eye during the extraction.

Capsule forceps.—When capsule forceps are used there are two great dangers.—The first one is that the patient must look down in order to introduce the forceps; then, if he looks up while the forceps are in the eye, there is danger of dislocating the lens. Many operators have discarded the capsule forceps, and have relied on cutting the capsule with the capsulotome in order to let the lens escape. Most operators would prefer to remove a piece of the anterior capsule with the capsule forceps if it could be done without danger. I have devised a capsule forceps that can be used while the patient is looking up. There is no danger of dislocating the lens, because the patient is looking up when the forceps are introduced, and if he should suddenly look down, the forceps would be out of the eye without any effort on the part of the operator.

Preliminary iridectomy.—A preliminary iridectomy should always be done, because the operation in itself is practically devoid of danger, and the extraction which is performed a few weeks later is simplified.

The choice of a cataract operation.—The choice of a cataract operation cannot always be decided upon before the operation is begun. It is impossible to determine what kind of an operation should be performed before the incision is finished. Much depends upon the incision, the size of the lens, and the condition of the zonula. It would be subjecting the patient to great danger to persist in doing an intra-capsular operation when the incision was small, the lens large, or any degeneration of the zonula existed, and much manipulation was necessary to expel the lens.

* The instrument is shown on p. 257.

My choice of operation for cataract is as follows :

The preliminary iridectomy having been performed, the surgeon, assistants, instruments, and patient are prepared as in any surgical operation. The eye is cocaineized by dropping in two drops of a four per cent. solution of cocaine three times at intervals of five minutes. The lashes are cut close to the lid at the outer canthus. My lid retractor is inserted under the upper lid, and held away from the eye by an assistant, who holds the lid retractor with the right hand, and depresses the lower lid with a finger of the left hand while the incision is being made.

The incision.—The incision is one of the most important steps in any kind of cataract operation. If a good deep incision is made, the intracapsular or any other method of operating can be readily accomplished, but many operators insist in making the puncture and counter-puncture in the cornea. If the puncture and counter-puncture are made as deep in the sclera as can be done with safety, and the incision is finished with one sweep of the knife, coming out about two millimetres from the sclero-corneal juncture, as recommended by Smith, any kind of extraction will be simplified.

The light.—A good operation cannot be performed with a poor light. I find this light* far better than daylight or any other kind of reflected light I have ever tried. An assistant can throw the light just where the operator wants it.

Where should the patient look?—Some kind of an object should be placed on the ceiling for the patient to look at, provided he has enough vision to see the object. If he cannot see, he should be instructed to look straight at the ceiling, but never to look down. This will give the eye a good, quiet position for the patient, and a good field for the operator.

Position of Surgeon.—After the incision has been completed, the surgeon changes his position from behind the patient to the right side and in front of him. The assistant does not remove the lid retractor, but keeps the eye open while the surgeon makes gentle pressure on the lower part of the cornea with the Jullundur hook, as is done in the intra-capsular operation by Smith. If the lens presents in the opening with slight manipulation, it is easily expressed in its capsule. If gentle manipulation does not make the lens present, my capsule forceps are introduced (closed) from above downward into the eye, when they are opened and a piece of the capsule is grasped and removed. The capsule forceps are now opened in a 5 per cent. solution of carbolic acid, to make sure that a piece of the delicate capsule has been removed. If a piece of the capsule has been removed, it can be seen in the solution. If no capsule has been removed, the forceps can be dipped in alcohol, followed by normal salt solution, and again inserted as before. The lens is now extracted by slight pressure on the lower part of the cornea with the Smith hook. The experienced operator (I want to emphasize the word "experienced") should be cautioned at the time the lens is being expelled, because from force of habit he might tell the patient to look down. The lens can be extracted quite as well when the patient is looking up, while the other position would subject him to great danger.

The Toilet.—Arranging the toilet is the same as is done after any cataract operation, Knapp's iris replacer being the instrument best adapted for the position of the patient looking up. The iris should be replaced if prolapsed, and any cortical or capsule fragments remaining in the wound should be removed. The patient should at this time be instructed to close his eyes, and the retractor should not be removed until after they are closed.

* Dr. Fisher employs an electric hand-lamp, provided with a reflector, so as to cast the light in any required direction.

Bandage and after-treatment.—The bandage should now be applied. Different opinions are expressed regarding the after-treatment. Some good operators do not disturb the bandage or give the eye any treatment for a week, when the bandage is removed and the eye is ready for dark glasses. Other good operators have various methods of after-treatment, some going so far as to leave the eye bandaged for only a few hours. If a good, clean, deep incision has been made with only one sweep of the knife, leaving the edges of the wound perfectly co-adapted, there will probably not be any great difference in the result of the operation, no matter what method of treatment is carried out. Probably fewer complications will follow the least treatment. If the patient does not complain after a cataract operation, it is quite safe to presume that he is getting along well, and any interference might only produce some complication. To make sure that no complication exists, and at the same time not to interfere with the eye, it is a good plan to remove the outside dressing at the end of the third day, but not to open the eye if the patient does not complain and the lids are not red or swollen. If all is well at this time, no further treatment, other than a bandage, is necessary for four days, when the patient is ready for dark glasses.

Should the Intra-Capsular Operation be recommended?—This is a question that should be carefully studied and decided as soon as it can be done in a practical manner, and the operators of large experience are the ones to settle it. There is certainly no objection to expert operators trying the intra-capsular operation, provided a good, deep incision has been made. If the incision is deep, the lens small, or the zonula degenerated, it will not take much pressure to tilt the lens and deliver it in its capsule. But if the lens does not appear at the wound with very little manipulation at this step, it will be better to use the capsule forceps and to deliver the lens in the same manner as we would in the intra-capsular operation. There seems to be no reason why all operators, whether they be of large experience or small, should not insist on their patients looking up instead of down during the expulsion of the lens, whether this be in its capsule, according to the Smith method, or out of it, as in using the capsulotome or the capsule forceps as advised by the author.

CONTRA-INDICATIONS TO THE INTRACAPSULAR OPERATION FOR CATARACT.

BY

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LONDON, ENGLAND.

MANY opinions have recently been published in ophthalmic journals with reference to the intracapsular operation according to the *technique* employed by Lieut.-Colonel Henry Smith, I.M.S., lately of Jullundur, and now of Amritsar. These opinions come from British and Continental, American and Indian ophthalmic surgeons, some of whom have and others have not seen Smith operate. Some have watched his operations under favourable, others under unfavourable, circumstances. Some have adopted his methods and been tutored by his hands; others have had hard things to say, and have condemned the operation. One or two of the most recent opinions are worth following. To quote one who judges from the results of the operations done by Lieut.-Colonel Smith at Bombay during the recent Medical Congress in that city:

"It is clearly shown by these cases that accidents occur and a high percentage of bad results follow intracapsular extractions even when the operation is performed by Lieut.-Colonel Smith himself, and, for my part, I now feel that the average patient is exposed to an altogether unnecessary danger by the operation."

One is glad, however, to note with regard to these cases, that the same author has also said:—

"It is evident that allowances must be made for the fact that Lieut.-Col. Smith was operating in unfamiliar surroundings (possibly without his trained assistant) but on this account the figures are the more valuable to the average operator who may think of attempting the operation without first making the pilgrimage to Jullundur."

I do not think it is wise to judge of any results of this particular operation under exceptional circumstances, especially if a surgeon has only consented to demonstrate his method by a *technique* for which he claims certain advantages. Doubtless, Lieut.-Col. Smith might have stipulated beforehand that the results should not be published, or if it were intended to publish them, that he should be allowed to attend to the after-treatment until the cases were discharged from the hospital. His contention in his reply which has received publication might be considered either reasonable or otherwise; but, on the whole, we would rather see a case through to the termination than leave it in unfamiliar hands.

Let us consider some other opinions by Continental and American surgeons, of whom some are Smith's adherents, while others are not. One of his adherents has said, "Major Smith's (now Lieut.-Col. Smith) success does not depend on the peculiarities of his patients. The operation is not suitable to patients under 30 years of age. Ruptured capsule is one of the accidents to be reckoned with, but it can *generally* be avoided."

Another, who is not an adherent, says, after an experience of sixty cases, that he disapproves of the intracapsular extraction without iridectomy, as it gives rise to prolapse of the iris within twenty-four hours in at least 35 per cent. of the cases. He found also that in some eyes the expression could not be carried out without loss of vitreous, and he formulated for himself the rule to continue the expression only when the edge of the lens appeared in the wound upon light pressure. He further believes that prolapse of vitreous during expression of cataract is due in most cases to adhesion of the lens to the *fossa patellaris*. This is an individual peculiarity and cannot be foreseen. He conceives it possible that Lieut.-Col. Smith's good results may be due to a racial characteristic of minimal adhesion of the lens to the *fossa patellaris*. He sums up the operation by saying that "the careful operator will . . . desist upon the slightest difficulty and proceed with the extraction with capsulotomy."

"Most of the opinions expressed hitherto dwell on the subject of large escapes of vitreous by the intracapsular method according to Smith's *technique*."

"By Smith's method, and with his unique opportunities, I think we must all recognise that it is possible to educate one's touch, by patience and practice, so that one learns (i) where and how to make the necessary and exact pressure and counter-pressure, and (ii) when and where to relax that pressure, in order to deliver the lens through the pupillary area, anterior chamber, and, finally, the lips of the incision."

Some time ago I pointed out in my work on the "*Methods of Operating for Cataract, &c.*," and more recently in the June issue of THE OPHTHALMO-SCOPE, the value of the intracapsular operation under certain conditions, and the *chief* contra-indication, namely, that on the least difficulty in delivery of

the lens, iridectomy should be tried, and if it fail to give easy delivery, capsulotomy should be done.

I maintain that in this operation it is possible even for the average operator to deliver the lens without difficulty ; but it is one thing to deliver it, and quite another thing to safeguard bad visual results by such a procedure, for unless there be easy delivery there is undue pressure either forwards or backwards, and even in both directions in expression, which undoubtedly must do injury of some kind to the delicate structures within, as I shall show later, owing to the undue strain exercised.

To hear of such expressions as "not suitable" or "not quite suitable" for Smith's operation, and others of a similar nature without proper and definite reasons, and also to hear that "ruptured capsule is one of the accidents to be reckoned with, but can be generally avoided," does not advance either our opinion in favour of or against the intracapsular operation.

All the points and essentials with regard to this operation and safeguarding both the eye and its visual results are what one desires to know more of, and to understand better. Since it is worth while to familiarise oneself not only with all methods, but with every racial characteristic in eyes, I think I shall be able to show that there is such a thing as a racial characteristic, and that in India, which is a wide land of many nationalities, there are racial peculiarities which are in some respects different from European ones.

If by any particular method or *technique*, we are able to give our patients the benefit of the best visual results with the minimum of risk to the eye, then, I say, we have every reason to give a surgeon who has had unique experience of the kind Smith has had, his opportunity, in all British fairness, to give us the benefit of his knowledge, while we should at the same time be fearless in pointing out the dangers of too great enthusiasm for one stereotyped method in all our cases.

Success in eye operations, particularly in so delicate an operation as cataract, depends, in my humble opinion, on the following :

(i) Correct diagnosis of the patient's fitness to undergo so delicate an operation.

(ii) Correct opinion of the nature and character of the cataract by (a) naked-eye appearances, (b) focal illumination, and (c) ophthalmoscopic examination.

(iii) The probable behaviour of such a cataract, before and during the operation, in connection with the delicate media and membranes it is in contact with.

(iv) The careful selection of a cycloplegic, and of an anæsthetic (local or general) for the particular case, in order not to prolong the operation or action of either of these.

(v) The nature of the operation, the extent of the incision, and the easy delivery of the lens with a minimum of risk or injury by either undue pressure on the part of the operator or strain on the part of the patient.

Some patients are more tractable than others, and bear an operation better; but sneezing, coughing, blinking of the eyelids, or fidgetiness, or restlessness mar the results in the most skilful hands. Hence, in some cases, such as these, a general anæsthetic is better than a local.

It is not sufficient to define the cataract as "soft" or "hard," as these terms, although in a manner correct, are misleading. It is essential, therefore, in dealing with a cataract to define its characters from early development to maturity, hypermaturity, and, in some cases, spontaneous absorption of the lens leaving only a membrane to deal with.

Such a classification as the following (which is from a recent British

authority) is useful for reasons which will be seen directly, as it shows the manner in which each particular form develops stage by stage, and how it is likely to influence the particular media and membranes of the eye both before and during the operation, and what we might expect as the after-results as regards useful vision.

Upon such knowledge depends success in treatment, and such success is the outcome of knowledge, experience, and practice, since these enable us to foresee dangers ahead and to avoid them if possible in the interests alike of our patients and of ourselves. We wish, if possible, to minimise risk, to ensure success (immediate and remote), and to give our patients the benefit of good sight.

Neither the intracapsular nor the extraction by capsulotomy can claim pre-eminence over that method which is known as the "eclectic" and which is the most scientific for reasons to be presently seen.

Primary Cataract.—Primary cataracts are independent of any inflammatory sign. In the early stage they cannot be diagnosed. Later, some defect in sight may be noticed by the patient, which may lead to an examination by focal illumination or the ophthalmoscope, when the surgeon notices signs of commencing maturity. First, a greyish or whitish-milky look within the pupillary area; then, an opacity which later, by focal illumination, looks greyish against a dark background, but by the ophthalmoscope appears black against a red ground.

To detect any commencing change in the capsule or substance of the lens at the periphery, it is necessary to dilate the pupil with a mydriatic, and the choice of a mydriatic depends on the age of the patient; but such a risk as a complete examination under mydriasis can be reduced to a minimum by the use of a 4 per cent. solution of cocain, and as soon as a thorough examination has been made, eserine drops (gr. ss. to 3 j of distilled water) should be placed into the conjunctival sac, and the patient should not be allowed to leave until the pupil has resumed its former state of contraction. Homatropin or atropin may be necessary in some cases, but care must be exercised in each case, and sometimes, indeed, even in the use of cocain.

Secondary Cataracts.—A secondary cataract results from some ocular disturbance or affection (iritis, uveitis, glaucoma, etc.) The term is sometimes applied to changes in the capsule or to particles of lens left behind after a cataract operation by capsulotomy. In exceptional cases in India (1½ per cent.), one gets after a successful intracapsular operation, a bluish-white haze, the fossa patellaris, which is somewhat similar in appearance to cases of membranous cataract, except for the absence of any calcareous deposits such as are noticed in the latter after spontaneous absorption of the lens has occurred. This condition has been more particularly described by me in my book on the "*Methods of Operating for Cataract, etc.*" and in an article in the June issue of THE OPHTHALMOSCOPE.

After-Cataracts.—The term "after-cataract" might rightly be applied to those changes occurring in the capsule or lens particles left behind after the operation by capsulotomy has been done. It occurs some time after the operation, and, as a rule, the patient finds that vision, which was fairly clear immediately after the operation, is now blurred or entirely obscured. This is removable by the "needling" which is usually undertaken some weeks later, and which may have to be repeated a second or third time, or even oftener.

Stationary Cataracts.—A stationary cataract is one that appears to be limited and confined to a particular portion of the lens (lamellar, anterior polar, posterior polar).

Of all the above forms of cataract, the *senile* is the one most frequently seen, and it claims the greatest attention. Such are either found in the nucleus of the lens or the cortex in early development; but sometimes in both lens and cortex.

In its advancement from the incipient stage, we notice either fine or coarse lines spreading in a stellate manner from the periphery of the cortex to the centre of the nucleus. They look like the spokes of a revolving wheel running into each other when a later stage is reached in maturity of the cataract. Ultimately, these spokes coalesce, to form a fairly homogeneous mass, and yet there is a certain amount of pearly lustre which may be either greyish-white or grey, and the very faint radiating appearance throughout is almost lost. Such cataracts, when immature, are fairly hard; at maturity they are hard; but when the hypermaturity sets in, they present different degrees of softness and at times are very soft.

When the maturing starts in the centre of the lens nucleus, another form results. There are then numerous finely set dots close to one another; but very different in appearance from the calcareous deposits in membranous cataract, which are coarse in appearance, with a bluish-white hazy background.

As regards maturation, in some cases a cataract may be either very rapid, or arrested in the incipient stage, or be very slow or stationary when the cortex is first involved. But in the case of myopes this incipient character may never go to maturity. This may be due to the position the lens holds between the various media and to its supply of lymph being kept up.

In the maturing which begins from the lens nucleus, there is a slow progressive change from the centre towards the periphery and cortex. This is due to the greater density and thickness at the centre as compared with the periphery.

When the maturing takes place both from cortex and nucleus, there is an advancement from centre to periphery, which, on the whole, is the slowest form that occurs.

Maturity is complete when the whole of the nucleus and cortex are opaque, and shown to be so by focal illumination and the ophthalmoscope.

During the progress of maturity there is a gradual swelling of the lens throughout, which, at one stage, arrives at the bursting point, as it were. In this process there is a pushing towards the anterior chamber (forwards), or the *fossa patellaris* and vitreous (backwards); but wherever the resistance to the lens is least, there the pressure is exercised most. In some eyes the lens seems to be maintained in *statu quo* (myopic eyes); in others it shares in all the movements attending accommodation to which the eye is subjected (in emmetropic and hypermetropic eyes). As cataract formation begins as the result of old age or premature decay—caused most probably by the same physiological changes as in atheroma and sclerosis—the lens becomes less pliable or plastic, and less able to take certain shocks transmitted to it, which must affect its coats and cause opacities. There are doubtless invisible changes in the coats and the capsule at first, which also, probably by a kind of osmosis, permit in some cases the aqueous fluid to filter into the capsule, thereby hastening maturity. Hence, side by side with these changes, the movements exercised by the muscles of the globe of the eye, and by the pupil in the act of accommodation, there must be an additional strain on the lens, which is nourished through the canal of Petit and the circumlental space.

As a rule, the vitreous lying within the hyaloid membrane, and the other coats of the eye, together with the adipose tissue and the bony walls of the

socket, offer most resistance, which, in the myopic or elongated eyeball has certain dangers connected with it when subjected to any strain, such as stooping or even sneezing. The capsule of the lens may be ruptured by a concussion from without, and this is due also to the resistance from within at the time of concussion.

If maturity begin in the nucleus instead of the cortex, and such nucleus be hard and resistant, the pressure in the case of the myopic eyeball is felt strongly in the centre of the *fossa patellaris* where the lens rests and exercises pressure when asleep, creating changes at that point. It seems to be the *point d'appui* of the resistance from the anterior part of the globe, as well as from the posterior when the patient is awake and when asleep respectively. The lens in early age is capable of being changed in its convexity both at the anterior as well as the posterior pole. The resistance is shared equally by the lens in its capsule, as well as by the hyaloid and vitreous up to a certain age, when the strain, shock, or violence spent on the eye from without (as well as from within in some cases of strong emotional effect through the brain, and the optic thalamus and optic nerve) must be acutely felt at times, and bring about further changes.

From my knowledge of various parts of India, cataracts in Bengal, Eastern Bengal, and Assam, mature largely from the cortex towards the nucleus of the lens. We see more elongated eyeballs of the myopic type. Whether race and diet (largely fish, which contains phosphorus, and rice, with pulse), as well as educational advantages, have a share in their production, is a matter for further investigation. We know from what Eastern authorities have written, that diabetes is more prevalent in India than elsewhere.

In the North-Western Provinces, Punjab, and further North, there are more cases of maturity from the nucleus to the periphery and cortex of the lens; but a large number of cases mature from both cortex and nucleus. There are greater powers of resistance in the Northern races; their diet is flour, pulse, and flesh, and not such quantities of fish; while their educational advantages, in a measure, are not so great as in Bengal. Calculus of the bladder is more prevalent here. Food and water are supposed factors. As to climate as a factor.—Heat, I think, is a greater test of the enduring powers than cold, and while the former parts of India (Bengal) have a very trying moist heat with functional activity of the skin among the people throughout the year, the latter portions of India have extremes of temperature in the hot and cold seasons, and are in a sense more trying; the skin does not act so freely throughout the year as in Bengal. The people do not become as anæmic as those in Bengal.

The question may well be asked what importance these three classes of cases mentioned with regard to advancement in maturity of cataracts, *i.e.*, from the cortex to the nucleus, and the nucleus to the cortex, and in both simultaneously, have to the ophthalmic surgeon? They are of as great importance, in my opinion, in deciding upon the nature of the operation for cataract in its various stages as the medical history of a particular growth to the surgeon before he operates, for it gives him a clue to the probabilities in the case, and what to expect as the result of operating.

The characters which a lens presents in a particular case and the conditions of the various tissues of the eyeball, as well as the particular formation of the whole eyeball, give us a clue as to the right method of dealing with it. In the same manner as the accomplished *accoucheur* mentally sees what the steps of the labour may be in his particular patient with a roomy or contracted pelvis, so the ophthalmic surgeon sees and weighs beforehand the probable results by adopting a certain line of operation. But it is only

when face to face with the patient on the operating table that he can finally decide the line of operation best to adopt. And this is the true eclectic and scientific method which is superior to other methods, and gives the most satisfaction to the patient as well as to the surgeon.

Why? Because at the last moment, there may be revealed to the surgeon certain points in the case which were before concealed from view, and which the employment of a cycloplegic or local anæsthetic, or both combined, has clearly exposed. Even the better light of the operating theatre may bring out certain points in the case.

Mydriatics alter conditions in the eyeball, the tension of which may be lowered or increased. Hence, they cannot be indiscriminately employed, before, during, or after an operation. In some patients, the pupils respond more rapidly to drugs than in others. In some instances, cocain, homatropin, and atropin will cause an active and rapid dilatation of the pupil, while in others the action is slow, sluggish, and most unsatisfactory. Some corneæ are smaller than others, and some anterior chambers are shallower than others *naturally* and also during the *process of maturing* of the lens. Some small corneæ have shallow anterior chambers with large mature lenses, others have hypermature lenses with soft and fluid cortical substance and a very small central nucleus. Should these points be ignored before undertaking an operation for cataract? I think not, for they are all essential bits of preliminary knowledge. For instance, if a cornea is small, and an anterior chamber shallow, and the pupil is slowly acting, while there is a large and dense senile cataract to be delivered whose diameter is greater than the diameter of the cornea is it wise to expect an *easy* delivery of that lens by an intracapsular operation with an ordinary *corneal* or even a *corneo-sclerotic* incision without an iridectomy as well? I say, it is dangerous or risky to expect such a thing. Under such circumstances, however anxious an operator may be to have a beautiful circular pupil without a coloboma, and however competent to exhibit patience, dexterity, and a form of *leger de main*, the pressure in expressing the lens by an intracapsular method of any kind *must* do an injury. That injury may not be immediate, or on the same day, or even the same week; but when visual results are tested, the loss to vision is greater than might have occurred if an iridectomy (fairly large), with a capsulotomy, had been done. The reasons are that such an eye was wholly unsuitable for the intracapsular operation, and, if so, there can be no justification whatever to venture upon something involving enormous risks to the patient's vision.

Suppose another case, with the same conditions of cornea and anterior chamber, but lens not so dense as the above, but with an active pupil. It may be a lens with a central hard nucleus but a soft cortex; or a lens with a fluid cortex around a central nucleus, which is either hard or moderately so. Here the conditions are vastly different, and one would be justified in trying to deliver the lens without an iridectomy first, for the simple reason that such a lens is more accommodating than a hard and resistant one, and may easily be delivered through a corneal or corneo-sclerotic incision. If it fail to come away easily, a small iridectomy would most probably be all required to deliver it; but if this failed, capsulotomy would be preferable to trying to deliver it forcibly, or doing a second, but larger, iridectomy. I mention these two probable cases, since they are pretty frequent with many of us. As I have said in my work on the "*Methods of Operating for Cataract, etc.*," and in my article in the June number of THE OPHTHALMOSCOPE, it is always well to try and deliver the lens by the intracapsular method, with a properly dilated pupil, or iridectomy, and if it come away with gentle expression *easily*, and without

strain, well and good ; but if there be the least difficulty or straining, desist. The capsulotomy operation therefore is more suitable for such a case, and this is another instance where the advantages of the eclectic method outweigh those of the intracapsular.

The inference drawn from the above two examples, and I might readily multiply them, is that you have an eye containing a lens which, owing to the difficulty of delivering (from your knowledge of the conditions present before and during the operation), would not permit of such a degree of external pressure, for the strain would injure the delicate membranes of the eye both in front and behind the lens, and such strain means bruising, lacerating, or rupturing the iris or the hyaloid membrane, which might lead to unhappy results.

I do not say it is impossible to deliver the lens either in skilful hands or in the hands of even an average ophthalmic surgeon ; nor do I consider that in certain cases where there is the chance of a *slight* escape of vitreous that the intracapsular operation is unjustifiable, for it is possible to make a larger incision in performing the operation, by going beyond the corneo-sclerotic junction into the sclerotic and thus delivering the lens, but it is a danger the patient is exposed to. In a certain percentage of cases (about $1\frac{1}{2}$ per cent.), there is a certain condition present in cataracts in India *which have taken long to mature*, and where a change through pressure has been brought about in the hyaloid membrane at the *fossa patellaris*, in which the operation is justifiable, since there is a very small escape of vitreous *after* the lens has been delivered. In such cases, the danger of vitreous escape after the lens has been delivered is not to be regarded seriously as when there is either a large escape or an escape *previous* to the delivery of the lens, for usually this means a dislocation or sudden gush of vitreous and lens, when enucleation of the eyeball has to be done later, as a rule.

I trust I have clearly shown the great importance of recognising the three classes of cases in which maturity has been advancing from centre to cortex and periphery, and from periphery to cortex, and in both cortex and nucleus respectively, in illustrating the line of operation to be adopted. Bearing these three classes of cases in mind, it now becomes easier to show that a lens which starts maturing at the cortex and advances towards the centre of the nucleus, does not take so long to mature as one which starts from the centre of the nucleus towards the cortex. If the lens, as a whole, is nourished, as we are told, through the lymph circulation to the ciliary processes and posterior surface of the iris, when the current to the lens passes through the canal of Petit and not from the vitreous, then, the cortex which has matured fully cuts off the supply to the nucleus, which must also mature very quickly after. But, in the case of the nucleus maturing first, the lymph supply to the cortex is still maintained at the periphery when the cortex is clear ; hence there is greater delay in maturing. Besides these two modes of maturation, there is the third, where the process begins in both cortex and nucleus together, which shows that the current of lymph is more evenly maintained throughout the lens substance than in the above two methods of maturing. And this seems the normal mode. It is much slower, on the whole, than the other two. It is an indication of a healthier state of things and greater powers of resistance. This form is present largely among the European races. Whence, cataracts of Europeans and Northern Indians are vastly more difficult to deal with than those of Bengal and Southern India.

It is a well-known fact that cataract in Indians matures earlier than in Europeans, and, I should say that the disease in Southern Indian races matures earlier than the Northern, while the Northern hold a mid point

between the European and his Southern brethren. Some observers have put down the period of maturity, so far as cataract formation is concerned, at ten years earlier in Indians generally than in Europeans; but for the whole of India, I should say it is perhaps more correct, on an average, to say, about seven years earlier, and for Bengal and Southern India, ten years earlier. Maturity among European races, particularly those of Northern Europe, might be deferred still later in those cases where it is arrested in the cortical form, if gout and rheumatism were eliminated from the system. In India, it could also be deferred if malarial fever and diabetes could be eliminated from Bengal, as well as the conditions which create stone in the bladder and remittent malaria from the North.

I have said before that there is a stage where the lens, in the act of swelling, makes pressure either forwards or backwards, according to the character of the eye. In a large percentage of cases—in fact in a very large percentage—the anterior chamber becomes shallow. At a still later stage, there is a slight shrinking of the lens and the anterior chamber regains its normal size and the whole lens hardens. We have then, either (i) a cataract of great density and hardness throughout both cortex and nucleus of the lens, and a homogeneous milky-white opacity, or (ii) with a harder central nucleus than the surrounding cortex, not so homogeneous but of a peculiar lustrous appearance like mother-o'-pearl; or (iii) an amber or yellow colour, sometimes approaching a darker shade of amber or a steel-grey, with a certain amount of lustre over the surface.

These are forms of *senile* cataract which at a later stage may be described as "hypermature." In the hypermature stage a softening occurs, and this softening is generally noticed in the cortex, in those forms where the maturing had begun in the cortex first, leaving the nucleus either hard, or of a certain degree of hardness. The colour of the nucleus may be white, whitish-grey, or of various hues, or grey, dark-grey, or what is known as black. In some cases (not so rare in India) the nucleus may be either very small with a fluid cortex around, or completely absorbed, with no fluid at all, but only a membrane; the former is known as *Morgagnian cataract*, and the latter as *membranous cataract*.

If we were to adopt the nomenclature for cataracts simply from their mode of maturing, then, those that matured from the cortex first, would be "cortical"; those from the nucleus first, "nuclear"; while those which matured in both cortex and nucleus at the same time, "cortico-nuclear" or "nucleo-cortical" according to the part of the lens which seemed most advanced. As a rule, this is the cortex in a large number, while in others it is from the nucleus, and in a third set of cases from both cortex and nucleus at the same time.

The classification of senile cataract adopted at the present day—namely, into "cortical" and "nuclear"—is from the colour and the fact that the cortex is largely affected. Hence, when a cataract is white or greyish-white, it is called "cortical" and when amber or dark-grey "nuclear" or "black."

I am of opinion that in Europe, owing to the fact that cataract maturity occurs in both cortex and nucleus simultaneously as a rule, the hard cataract was the term used, because in operating there was found to be great density and hardness in the substance of the lens. Whether this density and hardness, on the one hand, is due respectively in patients with a tendency to rheumatism or gout, is a matter for further investigation. The diet is of a higher standard than in the case of Indians (both Northern and Southern). We do sometimes, and in many cases in this country also, see different degrees of density and hardness; but these would depend upon the age and stage of

maturity of the cataract. At any rate, it is in these particular forms in Europe that the greatest care has to be exercised in operating and not deferring an operation too long, since all the processes of maturity and hypermaturity are delayed in Europe as compared with the tropics (India) and no sooner is a cataract mature, than it should be operated on; and as the eclectic method is far more satisfactory in results everywhere, but most satisfactory in Europe because of the tendency to acute changes in the tissues and membranes in the eye, it is undoubtedly *the* operation to be most carefully cultivated. The only way to do this is to understand the mode whereby cataracts mature.

No stereotyped method of treatment is adopted by the physician or the surgeon in any particular disease or operation. Varieties of conditions are found, and there must be the appropriate method applied to each case, or to each patient, even although the disease be called by the same name. Such a rule, as it seems to me, should apply equally to cataract operations.

Enthusiasm in one particular method of operating has its defects as well as its virtues, and in whatever position we are placed, let us by all means be familiar with all methods. We can then choose that which is best for our patients and for ourselves.

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TWO CASES OF MORGAGNIAN CATARACT IN WHICH NO TRACE OF A NUCLEUS COULD BE FOUND AT THE TIME OF OPERATION, TOGETHER WITH SOME REMARKS ON THE CLINICAL CLASSIFICATION OF SENILE CATARACT.

BY

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ON October 4th, 1910, a batch of eighteen cataract cases came up for operation at the Government Ophthalmic Hospital, Madras. Of these no less than six, or 33.3 per cent., proved to be cases of Morgagnian cataract. The usual percentage of this form of cataract on all cataracts extracted here is about 17. Of these six Morgagnian cataracts, two proved to have no nucleus whatever. The double coincidence seems to justify the publication of a short *résumé* of the notes, as in an experience of over 8,000 extractions I have only twice before met with complete absence of nucleus in Morgagnian cataract.

Case 1.—G. Vengada Pillay, a male Hindu, aged 54 years, a milkman, admitted to the Government Ophthalmic Hospital, Madras, on October 1st, 1910, for Morgagnian cataract of the right eye. Operated on October 4th. Discharged on October 31st. Family history negative of cataract. He first noticed dimness of vision five years ago, and has been blind for four years. The adnexa of the eye were healthy at the time of operation. The cornea showed an arcus senilis, the maximum diameter of which was 13 mm. The

iris was normal and active ; the anterior chamber was of normal depth ; the tension was normal ; vision=hand movements. The general health was good.

Operation.—Preliminary needling, performed as usual, was attended by the escape of a quantity of thick fluid into the chamber ; no nucleus was seen. On completion of the section, the patient squeezed suddenly and expelled a quantity of thick lens fluid of a sticky consistence, but not a trace of a nucleus could be found, although most carefully looked for. The capsule was very dense, but the patient was so unsteady that it was left alone. The chamber was washed clear with the irrigator, and the iris was at the same time replaced by the stream.

After-course.—There proved to be a wide aperture in the capsule, and the patient had 5/20 vision on the 12th day by the aid of a plus 9.0 D. sph. The cataract in the opposite eye was of the intumescent type, presenting the usual pearly sectors characteristic of such cataracts.

Case 2.—Yellamma, female Hindu, aged about 40 years, admitted on September 29th, 1910, to the Government Ophthalmic Hospital, Madras, for Morgagnian cataract of left eye. Operated on October 4th, 1910, and discharged on November 1st, 1910. No family history of cataract. First noticed dimness of vision four years ago, and was quite blind one year ago. (This history probably relates to the onset of blindness in the second eye ; at least, this is our common experience in Madras ; the lower classes do not notice the onset of blindness until it is far advanced in the second eye.) Adnexa normal. Cornea diameter 12 mm., iris active ; chamber shallow. Tension normal. Lens showed a Morgagnian cataract with irregular thickening of its capsule ; vision=hand movements. General health good, but woman advanced in pregnancy (eight month).

Operation.—On performing laceration of the capsule with a needle (our usual procedure), a large quantity of Morgagnian fluid escaped, and no nucleus was seen. A small incision was being made when the patient by a squeeze expelled a quantity of soft lens matter, leaving the pupil clear. It was plain that no nucleus was present, and the knife was withdrawn before the incision was quite completed, leaving a bridge of cornea above in the middle line. The chamber was washed out and the iris replaced according to our usual routine with a McKeown's irrigator. Not a sign of a nucleus was seen.

Three weeks later a wide aperture was torn in the thick after-cataract left by the first operation, and the patient six days later had vision of 5/15, with the aid of a plus 11.0 D. spherical lens.

Nature of cataract in the other eye.—Faint pearly sectors seen in a pale uniformly milky lens. The cataract was of the intumescent type, and was undergoing Morgagnian degeneration. This eye was operated upon on December 13th, 1910, and the patient left hospital on December 28th with vision of 5/15.

Remarks.

It will be noted that in both cases the second eye was suffering from "intumescent cataract." The diagnostic feature of such cataracts (in Indian practice at least) is the presence of well-marked "pearly sectors." The obvious forward bulge of the anterior surface of the lens, and the correlated shallowing of the anterior chamber, which are frequently met with, are

additional features which are not likely to be overlooked. The surface of the lens is seen to be mapped out into broad sectors, each of which has the lustre of mother-of-pearl. Such sectors are separated from each other by rays of ground-glass-like or milky cortex. The writer has carefully observed a very large number of such cataracts with a view to tracing the degenerative changes which take place in them. He has found that all grades can be followed from the lenses with well-marked pearly sectors of brilliant lustre, separated from each other by ground-glass-like cortex, to the typical Morgagnian cataract, in which a small, hard, brown nucleus floats in an uniform milky or creamy fluid. The first step on the way is the change of the inter-sectoral cortex to a definitely opaque and often milky substance. Next, the lustre of the sectors becomes less marked, and the intervening cortex becomes wider and more uniform. Then, the sectors disappear when the patient lies on his back and are only brought into view by causing him to lean his head well forward, placing one fist on his occipital region, and sharply striking it with the other. This manœuvre, which we commonly use to demonstrate the nucleus of such lenses, has the effect of driving all solid particles to the most dependent part of the chambers. If the head be now slowly and gently raised, such solid parts will be seen adhering to the anterior capsule for a short time, and the lens will then resemble an ordinary pearly sectoried or nuclear cataract, according to the stage of development the liquifaction has reached. If the patient lies back, and especially if the forehead be struck instead of the occiput, the solid parts fall back again and the original milky look of the lens will be restored. In Madras we use this method not merely to demonstrate the nature of Morgagnian cataracts, but also to ascertain the size of the nucleus in any individual case, and thus to acquire *data* for the graduation of the size of our cataract section. Obviously, the smaller the nucleus to be delivered the smaller the section required for safe delivery. From this point our present two cases carry us a step further, *viz.*, to the total solution and consequent disappearance of the nucleus of the lens. That this is a rare apotheosis of the degenerating lens may be gathered from the fact that one has only met with it four times in about 8,000 cases, although 17 per cent of all our cataracts in Madras are of the Morgagnian variety. Two important factors enter into the problem, namely, the age of the patient and the duration of the cataract. It will be noted that neither of these patients was very old at the time of operation. Moreover, the real duration of each cataract was probably much in excess of that stated; at least, this is uniformly our experience in dealing with uneducated people in Madras. The age at which the cataract commenced is thus put back several years in each case. One has often noticed that the nucleus of a Morgagnian cataract in a comparatively young subject is of the soft and sticky type, whilst in older persons it tends to be hard and well-defined, resembling a miniature hard nuclear cataract. This would appear to be largely a question of the size and density of the lens-nucleus at the time of the development of the cataract. It is not difficult to understand that the former type of nucleus will be more easily softened down and liquified than the latter. It will probably be safe to hazard the statement that in all cases in which total disappearance of the nucleus takes place, the process of Morgagnian degeneration will be found to have begun when the patient was young enough still to have a comparatively soft and limited nucleus.

As to the duration of the cataract, it would *a priori* seem likely that a long period must be required for the complete solution of the lens. Indeed, in all trustworthy cases of ordinary Morgagnian cataract the history given runs

into years, and any one familiar with countries where this type of cataract is common, knows that they have a longer history than other forms. The writer has removed several old Morgagnian cataracts in which the nucleus was reduced to the size of a cocaine lamella, and in which care was necessary to identify the tiny nucleus as it escaped. If this be not borne in mind, the presence of such small nuclei may be overlooked, as it nearly was in a case met with fifteen years ago. The man, who was comparatively young, gave a history of thirteen years' total blindness. No trace of a nucleus was found in his first eye when the Morgagnian fluid escaped, but a very careful watch was kept on the second eye, and the tiny lamella-like nucleus was found. It had probably been present but overlooked in the first eye.

The writer has for some years been studying the clinical appearance presented by various senile cataracts (as seen through dilated pupils), with a view of ascertaining how far the subsequent operative findings enable us to classify opaque lenses into definite clinical groups and thus to foretell the behaviour of each lens at the time of extraction and to determine the most advantageous modification of the method individually called for. A very large number of cases have been thus studied, and it is thought the following summary of the broad principles which have been evolved during this investigation may be of some interest, even although it constitutes a digression from the main subject-matter of the communication :—

(1) The Morgagnian cataract is derived from one kind of cataract and from one alone. It is the degenerative stage of the moisture-absorbing, intumescent, or pearly-sectored cataract.

(2) The pearly-sectored cataract and its later stage, the Morgagnian, are owing to consistency of the cortical matter, very easy of removal. Morgagnian cataracts are, however, frequently complicated by the presence of dotted thickenings of the anterior capsule, due to irregular proliferation of the posterior lining epithelium. This necessitates the removal of the central portion of the capsule, which is easily performed in this class of cases after extraction.

(3) The dry shrivelled cataract is the corresponding stage of a form of cortico-nuclear cataract the distinguishing feature of which is that it does not tend to absorb an excess of moisture. As maturity approaches, this class of lens assumes an appearance quite different from the former one. Opacification proceeds more rapidly in the cortex between the sectors of the lens than in the sectors themselves, and, as a result, the rays stand out more markedly than the intervening substance; we may speak of them as "rayed" cataracts. The sectors never assume the pearly look of the former class. The distinctive feature from the surgeon's point of view is that in them the cortex tends to separate from the nucleus in cohesive masses, and thus to be left in the chamber after delivery of the latter portion of the lens. In an early stage, the cortex is of a sticky doughy consistence; later, it becomes cheesy; and, finally, tough and brittle. Under the last-named circumstances, the cortex left in the chamber assumes the form of a complete cast of a large portion of the edge of the lens, and the operator finds some difficulty in completely removing it unless he uses an irrigator, with which instrument he can quickly and easily wash the chamber clear.

(4) The brown nuclear cataract of old people scleroses steadily right up to its surface, often presenting a metallic coppery sheen when seen by reflected light; in colour, the removed lens varies from amber to black. Surgically, the lens is broad and bulky, and requires a large section for its safe delivery. Before maturity is reached, it has a sticky edge which peels off during delivery, thus reducing the bulk of the mass; at times the

edge of the lens is thin and brittle and breaks off easily even after full maturity. The rule as to large sections must, however, be steadily kept in mind in all such cases.

Needless to say, one meets with many intermediate and mixed forms, but these cannot be discussed here without being carried too far from our present purpose.

A NOTE UPON THE DEVELOPMENT OF LAMELLAR CATARACT.

BY

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OPHTHALMIC literature contains few instances where the development of lamellar cataract has been definitely known to occur during childhood. From the statements sometimes volunteered by mothers it seems that this must really have occurred. Evidence of this sort, however, is scarcely likely to convince any scientific mind. On the other hand, in three cases such an event is vouched for on the authority of observers whose competence nobody is likely to dispute, namely, Louis de Wecker, Harold Grimsdale, and Hermann Knapp.

de Wecker was consulted in the case of a girl, aged nine years, whose left eye was affected with a lamellar cataract, showing some structural peculiarities. The other eye presented a transparent crystalline lens. But, ten months afterwards, the lens of that eye showed evidences of lamellar cataract.

Grimsdale (THE OPHTHALMOSCOPE, 1st August, 1905) was consulted in the case of a healthy lad, aged three years, whose sight was believed to be failing. Although the fundi yielded a good reflex, yet no view of the details could be obtained. In particular, there were no definite opacities of the lens, but Grimsdale felt convinced that the lens was at fault, inasmuch as the catoptric image from its posterior surface was by no means easy to see. Sight was defective. After several "needlings" one lens was removed, and it then became possible to get a clear view of the corresponding fundus, which was normal. The patient was again seen after the lapse of two years, when the lens of the eye that had not been operated on showed a typical zonular cataract.

Knapp's case (*Archives of Ophthalmology*, Vol. XXXV, 1906, p. 141) was as follows: a child, aged two years and two months when first seen on December 1st, 1896, possessed clear lenses. When examined four years later (November 20th, 1900), a thin and large zonular cataract was found to be present in both eyes.

To the foregoing cases I am able to add another, the details of which follow:—

Master Jack F——, 8 years, was brought to me on July 5th, 1900, because he complained that his eyes ached, and his mother thought that he did not see well. The sight of each eye was defective (6/18 and No. 1 Jaeger) owing to hyperopic astigmatism. Atropine drops were prescribed, but not used.

The patient was not seen again for seven years (June 15th, 1907), when sight was less than 6/60 and No. 16 Jaeger. Each eye showed a well-marked zonular cataract, with so-called "riders."

On June 28th, 1907, iridectomy down and in was performed upon the right eye, an operation repeated upon the left eye a few days later. The result was V.=6/24 and No. 4 Jaeger. The map of England which accompanies this note, was drawn by the patient (without glasses) in the following September.

The patient was seen on February 6th last, when R.V. *plus* 4.0 D. sph. with *plus* 1.5 D. cyl. axis 165° = 6/18, and L.V. *plus* 4.0 D. sph. with *plus* 1.0 D. cyl. axis 180° = 6/18. The "riders" did not extend into the clear area of the lens. The patient, now nineteen years of age, was working hard at a technical school for the profession of an electrical engineer, and was stated to be doing well.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—THE PATHOGENY OF CATARACT.

- (1) Frenkel.—Studies on the pathogeny of senile cataract. (*Etudes sur la pathogénie de la cataracte sénile.*) *Ann. d'Oculistique*, février and mars, 1910.
- (2) Cantonnet.—Cataract in a patient suffering from myxœdema and tetany. (*Cataractes chez une malade atteinte de myxœdème et de tétanie.*) *Archives d'Ophthalmologie*, mars, 1910.
- (3) Stricker, L.—The etiology of cataract. *The Lancet-Clinic*, June 11th, 1910.
- (4) Szily, A. v.—The embryological foundation explaining congenital cataract. (*Die entwickelungs geschichtlichen Grundlagen für die Erklärung der congenitalen Katarakte.*) *Bericht der Ophthalmologischen Gesellschaft, Heidelberg*, 1910.
- (5) Frank, E.—On the nature of the fits in zonular cataract. (*Ueber die Natur der Krämpfe bei Schichstaar.*) von Graefe's *Archiv f. Ophthalmologie*, Bd. LXXVII, 1 Heft, 11 Oktober, 1910.
- (6) Pisani, L. J.—On the conditions which may account for the greater prevalence of cataract in India. *Brit. Med. Journal*, October 29th, 1910.

(1) Frenkel, of Toulouse, gives a *résumé* of the results obtained by himself in previously published investigations into the pathogeny of senile cataract, and records a fresh series of experiments, in which he failed to produce cataract in animals by injections of lentitoxins. He refers to the work of Römer and others on the subject, and gives the following summary of the results of his studies:

1. From the point of view of pathogeny, senile cataracts are to be distinguished from those forms of cataract the causes of which are more or less known. In all probability, with the advance of our knowledge, the cataracts now grouped together as "senile" will be split up into divisions with different causes.

2. Senile sub-cortical cataract has general and local causes, both of them hypothetical. The local causes consist in a functional alteration of the epithelium of the ciliary body, allowing products, which are toxic for the capsular epithelium and the cells of the lens, to penetrate into the aqueous.

3. The general causes consist in a set of conditions which allow of the accumulation in the blood and body fluids of toxic fluids known as cytotoxins, some of which act on the cells of the lens (lentitoxins) and others on the cells of the ciliary body (cyclotoxins).

4. The accumulation of these substances is due to a failure in their elimination from abnormality in one or more of the general regulators of the system. Renal insufficiency, or diminution in the renal permeability, is the factor in the retention of these toxins which has been the most exhaustively studied.

5. In the form of senile cataract known as "spontaneous" the cytotoxins belong to the class of autotoxins, *i.e.*, are products of the cellular activity of the organism and derived from the destruction of the cells of the lens and ciliary body, which are functionally allied to each other.

6. Lentitoxins and cyclotoxins probably have a specific action on the cells of the lens and ciliary body, and do not exert any toxic action on the other parts of the organism.

7. There is no reason for admitting the existence of any form of arteriosclerosis. At any rate, senile cataract is not accompanied by general arterial hypertension.

8. The accumulation of cytotoxins in the organism is probably, within certain limits, a constant and physiological phenomenon, and reaches a degree injurious to the lens only when there is continuous interference with their destruction or elimination.

9. The predisposition to the accumulation of cytotoxins in a degree sufficient to produce cataract is created by heredity, which acts either on the regulators of the general economy, such as the kidneys, or on the energy of the cellular destruction, *i.e.*, the production of cytotoxins.

10. Pathogenic therapeutics should aim at destroying or neutralising the cytotoxins by introducing into the system specific anticytotoxins analogous to those which are known for other cytotoxins.

R. J. COULTER.

(2) A young woman, of 22 years, with undoubted signs of myxœdema and tetany, showed advanced cataract in the right eye and incipient cataract in the left. Attacks of tetany had occurred from time to time since the age of eleven years, chiefly during the winter time. The signs of Trousseau and of Chovstek were both present and well-marked, whilst the thyroid gland could not be felt. The cataracts had existed for four years. The right lens, soft and without a nucleus, was extracted with a particularly satisfactory result by de Lapersonne. **Cantonnet**, of Paris, considers that the presence of cataract must be regarded as part of the thyroid and parathyroid syndromes. **BERNARD CRIDLAND**.

(3) According to **Stricker**, of Cincinnati, cataract is caused by an interference with the processes of physiological progression and retrogression of the lens and its elements. We are dealing with an interrupted formation of the nucleus, on the one hand, and an interrupted normal, or a chemically altered, nutritive supply to the lens, on the other. Cataract is the expression either of an interrupted physiological process, or of a faulty nutritive supply. As the lens nucleus increases in size, its resiliency is diminished; during accommodation, therefore, internal strains are set up, which lead to the formation of splits and fissures. These spaces become filled with fluid, and can be recognised ophthalmoscopically as peripheral striæ. Once set up, the process continues. "Cataract," says the author, later in his paper, "is a nutritive change entirely chemical in its nature." The fluids of the vitreous and aqueous are similar in character, yet we know that when the aqueous enters the lens, solution takes place. The epithelial cells, then, must exercise a selective action upon the fluids which transude into the lens, filtering off something which enables the lens fibres to dissolve in the aqueous. If these cells are damaged by trauma or otherwise, this selective power is inhibited, and cataract ensues.

A perusal of the paper does not leave us with a very clear idea as to the exact mechanism in the mind of the author. Is cataract due to increasing sclerosis, internal strains, and fissure formation, to chemical noxa, or to changes in the capsule admitting solvents from the aqueous? **T. HARRISON BUTLER**.

(4) According to **v. Szily**, of Freiburg in Breisgau, there are three explanations of congenital cataract: inflammatory causes; well-known diseases of

metabolism: essential developmental errors in the lens depending upon a so-called "germinal variation." Certain cataracts are explained by the first cause, such are lamellar and central cataract. The author deals only with forms which can be referred to atypical laying down of the embryonic lens. The theory is confirmed by the examination of a series of lenses in all stages of development which exhibited a typical malformation. A buck rabbit suffered from a partial congenital cataract which he transmitted to most of his offspring. Dismembered scattered groups of cells were found at the stage when the lens vesicle was being separated off. These cells developed into lens fibres, but rapidly degenerated, involving neighbouring cell groups in their dissolution. Such a state of things leads to spindle cataract, to posterior polar, and to congenital punctate cataract. These forms can be referred to a defect in the separation of the lens vesicle from the ectoderm. T. HARRISON BUTLER.

(5) The old theory that zonular cataract is due to concussion of the lental system in the course of fits in childhood has been generally abandoned, although some kind of connection between the two is still considered likely, and Peters has lately suggested that the fits which occur in the history of zonular cataract are really of the nature of tetany and that the same tetanic spasms affect the ciliary muscle and cause disturbance of lental circulation.

Frank submitted all cases of zonular cataract recently seen at the Heidelberg *Klinik* (38 in all) to a searching clinical analysis, and found that in one case only was tetany present and that even then a causal connection between cataract and tetany was extremely unlikely. Rickets play the most important part in the causation of zonular cataract; it was present in 68.1 per cent. of Frank's cases, 42.8 per cent. of which were also liable to some kind of fits. But it must be remembered that the great majority showed symptoms of slight rhachitis only. Frank's figures are in substantial agreement with older statistics. It should also be noted that both the congenital and the late appearance of zonular cataract have now been conclusively established, the first by Hosch and others, the second only recently by Knapp.

R. GRUBER.

(6) Cataract is more prevalent in the northern provinces of India than in the southern provinces of Burmah. In the Punjab the cataract extractions amounted to 308.43 per million of population. Burmah gives a ratio of 4.74 per million only. The difference is so great that it cannot be accidental. **Pisani** having summed up the evidence in favour of and against heat or light being the cause of the disease, suggests that prolonged intense dry heat may produce alterations in the aqueous inimical to the normal nutrition of the lens.

T. HARRISON BUTLER.

II.—ELECTRIC CATARACT.

Bichelonne. — Unilateral cataract following injury by electricity. (Cataracte unilatérale après électrocution industrielle.) *Ann. d'Oculistique*, août, 1910.

Bichelonne records the case of a man, aged 31, with a good personal and family history, who received a shock from an electric current of 30,000 volts, which rendered him unconscious for four hours and caused extensive burns of his right foot and the right side of his head and neck. Ten days after the accident, the patient developed slight conjunctivitis in his right eye, which yielded in a few days to treatment with sulphate of zinc, but was followed

almost at once by slight iritis, which got rapidly better under treatment with atropine. Seven months after the accident, the patient noticed the sight of his right eye beginning to get dim, but did not seek any advice until six weeks later, when the vision of the eye was reduced to $\frac{1}{4}$ and there were slight peripheral lental opacities in it, but no other abnormality. Three months later, the cataract was complete and homogeneous, of a whitish colour, and was swollen, causing a shallow anterior chamber. Four months later, the condition was unchanged.

This is the seventh recorded case of electric cataract. From a comparison of its history with those of six others, the author draws the following conclusions.—The lesion is produced only when one of the points of application of the current is close to the ocular region, and hence it is rare and almost always localised on the side struck (one case was bilateral). It develops a considerable time after the accident, and depends on a local trophic process, circulatory or other, acting on a tissue which is more vulnerable than those which surround it. The voltage in the recorded cases varied from 500 to 200,000.

R. J. COULTER.

III.—THE NON-SURGICAL TREATMENT OF CATARACT.

- (1) Römer, P.—Shall the organo-therapeutic experiments with senile cataract be continued? (Sollen die organo-therapeutischen Versuche beim Altersstaar fortgesetzt werden?) *Bericht der Ophthalmologischen Gesellschaft, Heidelberg*, 1910.
- (2) Dor, Louis.—The abortive treatment of incipient cataract. *La Clinique Ophthalmologique*, 10 janvier, 1911.

(1) Römer, of Greifswald, has continued his researches on the action of lens albumin taken by the mouth upon the development of senile cataract. He has found that nuclear cataract is not influenced by the treatment. The same is true for punctate cataract, which is very common at Greifswald. There remains therefore only sub-capsular cataract. The disappearance of opacities has not been noted. In some cases there has been slight improvement in vision, but this occurs also in untreated cases. A comparison with a series of untreated patients, tabulated by Hundmann, would seem to show that the cataract in these cases developed more rapidly than in those fed with lens substance. But so far there is no convincing proof that the treatment has been a success or, indeed, even a partial success.

T. HARRISON BUTLER.

(2) Louis Dor, of Lyons, has enrolled himself among the firm supporters of the method of treating cataract by locally applied drugs. The eminent position of the writer demands that full consideration be given to his views on this matter.

The medical treatment of cataract had fallen into disuse when Badal advised instillations and eyebaths of three per cent. solution of potassium iodide. From this time the method has had various results in the hands of different observers, although, if a referendum of oculists were taken, Dor thinks the response would be mainly unfavourable. Dor's own opinion is that the method, as advised by Badal, has a certain value, but that it is not sufficient for the majority of cases. "As the result," he goes on to say, "of

considerations as to the pathogenesis of cataracts I have reached a modification of Badal's *technique*, and the results which I have observed during the last three years are such that I do not hesitate to speak of cure in a few cases, of amelioration for the majority, of the maintenance of the *status quo* for others, and of failure in only a very small proportion of cases. My investigations were based on the well-established idea that cataract is produced by a ferment which passes into the aqueous humour, whereas it ought to remain in the blood. This ferment, which is a hydrating one, determines the hydration of the albumins of the lens."

With a view to the destruction of this ferment, Dor has experimented with many drugs and combinations, and has evolved the following as the best :--

Desiccated sodium iodide	...	...	...	...	5 grms.
Crystallised calcium chloride	...	...	...	...	5 grms.
Distilled water	...	...	...	...	400 grms.

The results which Dor has obtained had better be given in his own words.—"With this solution one can check the progress of at least eight cataracts out of ten, can cure one, and can expect failure in the tenth. When I speak of the "cure" of cataract I allude, naturally, to cataracts which are quite incipient, to those in which V.A. is still $1/2$. At the end of two months one can get the acuity up to 1, and can restore to these patients a presbyopia which corresponds to their age, whereas in every progressing cataract the presbyopia is in advance of the age. The few striæ which are visible at the periphery of the lens do not all disappear, but no new ones are produced. The probability is that the fibres which return to normal are those which have not yet become visibly opacified. These fibres had been swollen, and their refraction altered. I have aimed at the restoration of these fibres, and it is this restoration which I have called the cure of the cataract."

Partial failures may be due, Dor thinks, to the cataract being of the stationary variety, perhaps congenital. Failures are to be expected when the cataract is associated with diabetes, intestinal intoxication, retinal detachment, or retinitis pigmentosa.

The author has treated fifty cases by means of eye-baths with the above solution. Five of these have been cured for two years, and have recovered normal visual acuity in each eye. About forty return to Dor from time to time, undergoing intermittent treatment. They almost all say that the treatment has done them much good, and that they read and work much more easily than formerly. In only five cases has it been necessary to advise cessation of the treatment, on account of a persistent fall in the visual acuity.

The method of using the solution consists in its application for half an hour a day for each eye, by means of a glass eye-bath which has an indiarubber ring round its edge, to prevent pain from the prolonged pressure of the edge of the glass, or alternatively, if the pressure be insufficient, loss of the fluid over the cheek. The solution is used warm, and it is useless to make winking movements, since what is wanted is osmosis through the cornea. There is no smarting if the solutions are made with pure salts, freshly crystallised, and protected from light and damp. The treatment should last for several months without interruption, and can then be dropped and re-commenced. The results have been so much superior to those obtained with iodide of potassium that the author is convinced he is doing a service to his brethren in making known his formula and the method of using it.

"One can almost promise an improvement to every patient who has still an acuity of 0.2 ; those who have an acuity of 0.5 and who formerly had 1, can almost always recover the latter degree."

ERNEST THOMSON.

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IV.—OPERATIONS (CATARACT).

- (1) Stricker, L.—A historical review of the development of the cataract operation. *The Lancet-Clinic*, June 12th, 1909.
- (2) Fernandez, Francisco M.—Cataract operation on the insane. *Medical Record*, April 2nd, 1910.
- (3) Dimitry, T. J.—Two cases of successful extraction of senile cataract from the eyes of lepers. *Annals of Ophthalmology*, Vol. XIX, April, 1910, p. 239.
- (4) Clark, C. F.—The possible influence of racial and other characteristics in accounting for the success of the Smith Indian operation. *Trans. American Ophthalmological Society*, Vol. XII, Part 2, 1910, p. 315.
- (5) Stanculeanu.—Cystectomy in cataract operations. (La kystectomie dans l'opération de la cataracte.) *Ann. d'Oculistique*, juin, 1910.
- (6) Sattler.—Further observations on the joint removal of capsule and lens. *Ophthalmic Record*, July, 1910.
- (7) Windle.—A traumatic cataract operation. *Ophthalmic Record*, July, 1910.
- (8) Rollet, E.—Considerations upon 2,430 cataract extractions. *Revue Générale d'Ophthalmologie*, 3 août, 1910.
- (9) de Micas.—Some reflections on the operation of cataract and its results. (Quelques reflexiones sur l'opération de la cataract et ses resultats.) *Recueil d'Ophthalmologie*, septembre, 1910.
- (10) Fink, G. H.—Drainage after cataract operations. *Brit. Med. Journal*, October 26th, 1910.
- (11) Ewing, Arthur E.—Partial abscission of the anterior capsule in cataract extraction. *American Journal of Ophthalmology*, October, 1910.
- (12) Fernandez, Santos.—Procedures to avoid post-operative accidents and to shorten the duration of the operation of simple extraction of cataract. (Procédés pour éviter les accidents post-opératoires et abrégier la durée de l'opération dans l'extraction simple de la cataracte.) *Recueil d'Ophthalmologie*, octobre, 1910.
- (13) Valois.—Extraction of an opaque lens dislocated into the anterior chamber and vitreous. (Extraction d'une cataracte luxée dans la chambre antérieure et le corps vitré.) *Recueil d'Ophthalmologie*, novembre, 1910.
- (14) Hulen.—A new operation for the extraction of a cataract in its capsule. *Ophthalmic Record*, December, 1910.
- (15) Kalt.—Cataract operation with suture. (L'opération de la cataracte avec suture.) *Bull. et Mém. de la Société française d'Ophthalmologie*, T. XXVII, 1910, p. 131.

- (16) Terson père.—The best method of tearing away a piece of the anterior capsule in the operation for the extraction of cataract. (*Procédé de choix pour l'arrachement d'un lambeau de la capsule antérieure dans l'extraction de la cataracte.*) *Bull. et Mém. de la Société française d'Ophthalmologie*, T. XXVII, 1910, p. 163.
- (17) Smith, Edwin Temple. — A note on anterior chamber irrigation after cataract extraction. *Ophthalmology*, January, 1911.
- (18) Schmidt, H.—Cataract section in one movement. (*Der einzugige Staarschnitt.*) *Zeitschrift für Augenheilkunde*, Januar, 1911.

(1) This interesting lecture by **Stricker**, of Cincinnati, is largely taken from Hirschberg's well-known writings on the subject. Stricker speaks very favourably of Major Smith's method, and regards it as the operation of the future. Should the results obtained by Smith, 99.42 per cent. of *first-class results*, ever be approached in Europe, it will doubtless displace the orthodox methods, which, in the best hands, only give about 80 per cent. of first-class results. But even Major Smith can get this phenomenally high percentage at Jullunder only; his results at Bombay are not nearly so encouraging.

T. HARRISON BUTLER.

(2) The sum and substance of **Fernandez'** short article is to be found in the final sentence:—"Cataract operation can be carried out in the insane. It may be a little more dangerous than in sane people, but not much more." Four cases are reported, and in all cocaine only was employed as the anæsthetic.

ERNEST THOMSON.

(3) **Dimitry** reports these cases in order to show that leprosy presents no contra-indication to the extraction of the cataractous lens. Both were uncomplicated senile cataracts, and were coincident to the leprosy dyscrasia, for neither case presented any leprosy condition of the eye, with the possible exception of a madarosis of the eyebrows. Both cases were of the tubercular form, and the diagnosis was made from general appearance.

CASE I.—A white male, 56 years of age. Incision occupied about the upper third of the cornea, with a conjunctival flap and iridectomy. The resulting vision was O.S. + 1.75 D.C. ax. 5° with + 12 D. Sph. V. = 20/XL., with + 16.00 Sph. V. = No. 2 Sn.

CASE II.—A Malay, male, 60 years of age. A similar operation to Case I. The resulting vision was with + 10 D. Sph. 20/XXX.

JOHN WHARTON.

(5) **Stanculeanu**, of Bucarest, states that for the past eighteen years, Professor Manolesco has used a von Graefe's iridectomy forceps for removing the anterior capsule of the lens when extracting cataracts. After an iridectomy or iridotomy has been performed, the instrument is introduced sideways, with the blades closed, until its extremity is opposite the edge of the pupil, turned so that the convexity of its curved ends (not the points) is directed backwards, pushed gently back against the capsule, closed, and withdrawn, when a piece of the membrane, from 7 to 8.5 mm. in diameter, is usually removed by it. In 2,298 cataract operations in which this method was employed, between 1899 and 1909, the percentage of secondary cataract was only 3.5. The author has modified the iris forceps for use in simple extractions by giving the extremities an increased curvature and making them project backwards from the axis of the arms, so that when closed, the instrument resembles a dinner fork. To get the iris out of the way he puts in a drop of 1 per cent. homatropine twelve hours before the operation, and to avoid prolapse, he instils a drop of $\frac{1}{2}$ per cent. solution of eserine in oil after the extraction.

R. J. COULTER.

(6) **Sattler**, of Cincinnati, states that the delivery of the lens is made through firm, deliberate, and continuous pressure with the blunt point of a large strabismus hook at a point near the lower margin of the cornea. "The object of this pressure is to rupture the zonular, to tilt, in rotation or by upward sliding, the whole body of the lens, and force it into the large opening of the original wound which it must fill or completely occupy and where it must be held by the skill of the operator from first to last or until the zonular attachment is peeled off" He gives an account of twenty-five consecutive cases of cataract in which the attempt was made to extract the lens in its capsule. In four of these the attempt at intracapsular extraction failed, and the lenses were delivered by the ordinary methods, with uneventful recovery. Of the remaining twenty-one, there was loss of vitreous in eight and in one of these the capsule was ruptured and retained. The entire eight made good recoveries. The visual acuity was under '5 in five and over this in three. All had drawn-up pupils, and could not therefore be classed as perfectly successful surgically. Eight of the remaining thirteen had full vision, the other five had vision higher than '6, but they had some pupillary deformity. Recovery was more rapid, and iritic complications less frequent than in the ordinary method.

In three of the thirteen cases, haziness of the cornea occurred, but without pain or complication. The opening incision was in all a more or less peripheral one, "its amplitude and large flap of conjunctiva its distinguishing feature." In the first eight he made a very small iridectomy, but he found that this was apt to be followed by incarceration and agglutination; he adopted the large and peripheral iridectomy with advantage. In Sattler's opinion, the section and the small iridectomy are the greatest objections to the Smith method, and for the Anglo-Saxon and Latin races he has no doubt but that an ample peripheral incision encroaching more on the scleral than on the corneal side, and having a conjunctival flap, is the safest, although the purely corneal incision certainly renders the intra-capsular extraction easier.

Extraction with iridectomy and capsule opening is still the safest in the hands of ordinary ophthalmic surgeons of comparatively limited experience of operating for cataract. The Indian operation should be selected for all cases of capsular thickening, Morgagnian and otherwise, and also for excessively slow and stationary incomplete opacities in individuals past forty-five years.

J. JAMESON EVANS.

(7) **Windle**, of Oskaloosa, Iowa, records the case of a man who bumped his eye against an iron bar, thereby rupturing the cornea for about 8 mm. in the upper outer part near the limbus, and expelling the lens, a large fragment of which was found in the conjunctival sac, and tearing away a large part of the iris, thus forming a coloboma without any incarceration. The fundus was normal, and the media were clear with the exception of a small fragment of capsule at the lower part of the pupil. No lens matter remained after the accidental expulsion of the lens, and healing of the wound took place by first intention without any marked inflammatory reaction or iritis. V.=20/100 c. +9 D. Sph. +2 D. cyl. axis 165°.

J. JAMESON EVANS.

(8) The statistics of his operative results in 2,430 cataract cases, as given by **Rollet**, of Lyons, are so condensed as to be useless for abstraction. They are apparently prepared with a view to comparison with the statistics of extraction in the capsule (an operation which Rollet hardly ever performs) when these shall be forthcoming. "*On parle beaucoup actuellement d'extraction dans la capsule, sans donner toutefois encore de statistiques précises.*"

ERNEST THOMSON.

(9) **de Micas** discusses the question whether both eyes should be operated upon at the same time, the necessity for the patient to get familiarised with the surroundings before the operation, the treatment of eyelashes and eyebrows, method of dealing with garrulous patients, what is meant by "successful" operation, and how far the surgeon should explain to the patient the advantages and disadvantages of cataract operation. Opinions vary widely as to what constitutes successful operation. It can be claimed that the operation has been successful if the vision is better than it was before operation; others demand that the vision should be "useful"; others that it should be equal to one-tenth, others one-sixth or one-fifth. The patients' view of the success is also extremely variable, as one may be delighted with one-tenth, whilst another would be dissatisfied with two-thirds. The author is no great believer in irrigation as a means of clearing out soft lens matter. He believes that much of the disappointment after operations is due to the impatience of patients and surgeons to have the operation done quickly, and in consequence it is often done before the cataract is mature. The diagnosis of the maturity of the cataract is a most important preliminary to a successful cataract operation.

J. JAMESON EVANS.

(10) The semi-recumbent position is the best for the first few hours after operation, according to **Fink**, of London. Then, the patient should lie over towards the operated eye. Fink is accustomed to close the eye with an antiseptic plaster. He often introduces a fine rubber perforated drainage tube, passing it between the lids and out at each side.

T. HARRISON BUTLER.

(11) **Ewing**, of St. Louis, who objects to extraction in the capsule, and to removal of the central portion of the capsule with forceps, has tried—apparently in one case only—to buttonhole the capsule in the centre by means of de Wecker's scissors. At the time of operation, he did not think he had succeeded, for the opening of the capsule had to be completed in the ordinary way. Subsequent examination, after healing, seemed to give evidence that the buttonhole really had been made, although it had not been large enough to allow the passage of the lens. At any rate, the patient obtained good vision. Ewing is continuing his observations.

ERNEST THOMSON.

(12) **Fernandez**, of Havana, finds a conjunctival flap, about one centimetre in length, a great advantage in simple extraction of cataract. It prevents the formation of synechia anterior and hernia of the iris, making suture of the cornea unnecessary, and favours the union of the wound, protects it from infection, and reduces the injury to one of conjunctival wound, and consequently pain, photophobia, and iritis are, in his experience, rare complications of simple extraction with conjunctival flap.

J. JAMESON EVANS.

(13) **Valois**, of Moulins, in a diabetic patient, had double cataract, and one lens had been displaced, so that the upper border projected into the vitreous, and the lower border into the anterior chamber. Iridocyclitis and glaucomatous symptoms with very severe pain followed and it looked as if the eye would have to be excised, especially as there were slight ciliary injection, and obscurations of sight in the other eye. Valois, however, decided to remove the dislocated lens first. He transfixed the lens with a discission needle, and brought the whole lens into the anterior chamber; then he made a corneal section with a conjunctival flap, and removed the lens with Graefe's spoon. Pain disappeared a few hours after the operation; the anterior chamber was re-formed forty-eight hours later. Notwithstanding numerous vitreous opacities, the patient regained vision of $\frac{10}{10}$ c. + 11 D. eight days after the operation.

Symptoms of irritation of the companion eye soon disappeared.

J. JAMESON EVANS.

(14) **Hulen**, of Houston, Texas, from a critical study of present methods

and a limited personal experience of intracapsular extraction, has come to the conclusion that methods, in which the principle of pressure and manipulation of the globe is used to extract cataract in its capsule, should be given up.

He describes a new method (successfully used in six cases), in which the lens is fixed by a small vacuum cup and is lifted out of the eye, whilst still in its capsule. "The vital part of the vacuum extractor is the cup; its diameter is 5mm., the depth 2mm., the curvature of the cavity is that of a sphere 6mm. in diameter. The bowl is exceedingly thin and the opening into the stem is made as large as possible, the edge of the ring is rounded and there is a narrow flange to aid in slipping the cup in place under the pupil." The cup is mounted on a hollow handle (with or without stop-cock) which is connected with a 5 gallon bottle (with a vacuum gauge) which is connected with a foot pump. The preliminary preparations for operation are as usual except that atropine is put in the eye an hour before operation. The corneal section includes half the circumference, a conjunctival flap is raised above, a small iridectomy is performed. The speculum is now removed and anterior chamber cleared of blood by means of a gentle stream of warm saline solution. An assistant holds the upper lid with a retractor and controls the lower lid with the other hand, and at all cost, prevents pressure on the globe.

The extractor is introduced through the section and gently let down on the lens, making sure the cup is everywhere free of the papillary margin, so that the iris is not pinched. The patient should look straight ahead, *never down*, "with the cup resting on the centre of the anterior capsule, and the vacuum gauge at '25,' the nurse turns the cock at the gauge, and the vacuum thus connected, will cause the cup to grasp the cataract most rigidly. The extractor is then somewhat elevated and rotated to sever the suspensory ligament; now with the upper edge of the cup slightly raised, the cataract in its capsule is slowly and gently lifted out, passing easily through the pupil and section."

J. JAMESON EVANS.

(15) **Kalt**, of Paris, who advocated suture of the cornea as part of the operation of extraction of cataract ten years ago, now takes up the subject in the light of the experience he has gained since the publication of his original article.

He employs a slightly modified de Wecker's needleholder, and curved needles of extreme fineness and sharpness, made for him by the firm of Moria, of Paris. The suture is of cotton, composed of two or three strands. For taking out the threads, three days after operation, Kalt employs special scissors, also made by Moria. As regards *technique*, the suture is composed of a vertical corneal portion and of a transverse episcleral portion, the whole resembling a T. The length of the two portions does not exceed a millimetre each. The vertical branch stops exactly at the junction of the transparent part of the cornea with the sclera. The horizontal branch traverses the opaque portion, as close as possible to the cornea. An interval of half a millimetre is adequate to allow the blade to pass between the two sutures. If the sutures are correctly placed, the folding of the cornea, when they are tied, amounts to nothing. Neither is there any effect upon the post-operative astigmatism. Jerking movements communicated to the sutures tend to reduce a prolapsed iris and to keep the vitreous in place. The wound once closed by the sutures, and the iris in position, soft cortical masses are removed from the pupillary field by means of Redard's aspiration canula. One eye is alone bandaged, and the patient is kept in bed for a couple of days. As to accidents, Kalt

recognizes one alone as being due to the suture, namely, infection of the suture track. It is exceedingly rare, and is said to do no particular harm provided the suture is taken out in time. Prolapse of the iris has been met with by the author in three per cent. of 1,100 operations.

Extraction with suture is indicated, according to Kalt, in all cases of cataract, senile or otherwise, not complicated with adhesion of the iris or associated with such possible sources of infection as lacrymation or chronic conjunctivitis. Finally, the author combats the widely held view that his operation is specially difficult to perform. SYDNEY STEPHENSON.

(16) **Terson père**, of Toulouse, is convinced that the tearing away of a flap from the anterior capsule of the lens is quite the best way of avoiding a troublesome secondary opacity after removal of cataract. In the hands of every careful surgeon, it should replace cystotomy, inasmuch as it meets almost all the indications attributed to extraction in the capsule, and is much less dangerous than the last-named.

According to Terson's view, the piece of capsule taken away should be big enough to prevent what is left from uniting and in that way forming a new capsular sac and an ulterior secondary opacity. Indeed, in his view, any attempt to remove the whole of the anterior capsule may lead to rupture of the zonule and consequent subluxation of the lens and escape of the vitreous humour. The best capsular forceps are those of which each blade is provided with two teeth, and given an inverse curve, in order to follow the concavity of the cornea in the anterior chamber.

A necessary preliminary to operation is to examine closely the anterior capsule, so as to form an idea whether it is or is not thickened. In the latter case Terson removes a piece of the capsule with his forceps and then rapidly introduces the cystotome, in order to separate still further the remains of the capsule, unless he is quite assured that he had torn away a large enough piece in the first instance. In the former case, when the capsule appears to be thickened, the cystotome is used to begin with to button-hole the capsule, and after that a flap is removed with the forceps. Terson performs the combined extraction of cataract in more than two-thirds of his cases.

SYDNEY STEPHENSON.

(17) **Smith**, of Queensland, speaks very favourably of Harman's adaptation of the 'Undine' for the purpose of anterior chamber irrigation, as described in the *Ophthalmic Review* of November, 1909. He has used it in Australia under the most unfavourable operative conditions. He finds the apparatus both simple and safe.

A. J. BALLANTYNE.

(18) It is unnecessary to follow **Schmidt**, of Wilhelmshaven, through the long mathematical explanations of the various processes which take place when a knife enters the cornea and a section is made, explanations which are freely illustrated by figures and diagrams which vary for each variety of knife used. It will be sufficient to confine ourselves to the practical deductions which Schmidt draws from his geometric examination of the forces and strains determined by the act of cutting. Two conditions must be satisfied by a successful section of the cornea in extraction.—The wound must offer an easy and uncomplicated outlet for the lens, and it must heal quickly and without undue reaction. To fulfil the latter demand, the edges of the wound must be as smooth and cleanly cut as possible and must enclose no corners or pockets. It is sufficiently obvious that an even wound cannot be expected when the section is made by a series of sawing movements. It can only be made by a single clear sweep of the knife; the single-action cut is the most important desideratum of the operation. The act of making the section is complicated by the elasticity and tension of the cornea. The elasticity allows the circular

form to be distorted by the opposite pulls of the knife and fixation forceps; this becomes the more evident as the aqueous escapes. Knives can be classed in two groups.—Those which, like Beer's knife, completely fill the lumen of the wound, and only allow the aqueous to escape at the end of the act, and narrow knives of the v. Graefe type, which allow the aqueous to escape as soon as the counter-puncture is completed. All knives are modifications or combinations of these two widely separated and extreme types. Both Beer's knife and v. Graefe's lend themselves to a perfect edge; the highest possible degree of sharpness can be obtained, and it is equal all along the knife. Some of the modifications, especially the curved form introduced by Haas, must be sharpened on a curved hone, and, in consequence, equal keenness at all points is technically almost unobtainable. Beer's knife has had the great advantage that the section is made in one forward stroke, and is clean and smooth. But it has the equal disadvantage that if the section be commenced inaccurately the direction of the knife cannot be altered. The narrow knife enables a false start to be rectified, and the narrower the blade the more easily can the direction of the cut be modified. It has the disadvantage that the aqueous rapidly escapes, and the cornea becomes distorted, rendering an accurate ending of the section difficult or even at times impossible. The sawing action, even if reduced to two or three motions, gives an irregular wound. No alteration in shape will correct this fault until the Beer form is approached. The distortion of the cornea is less if Monoyer's two-pronged fixation forceps are used. The latter is, however, liable to tear the senile and fragile conjunctiva. The author has designed a semi-circular half ring, which he presses against the cornea from above. It has five sharp hooks, $\frac{1}{2}$ - $\frac{3}{4}$ mm. long, which engage the conjunctiva. This instrument fixes the globe, and at the same time prevents any distortion. He has used it for ten years, and *has never had any loss of vitreous!* We gather that Schmidt, although he wishes to obtain a section by one action, realises that he can only satisfy his wish by using Beer's knife, whose disadvantages outweigh its advantage in this respect.

The concluding paragraphs will be read with some excusable pride by English folk, Schmidt has had photographs made of the edge of the best German knives and one of Weiss's London productions. An examination of these photographs, which are given in a plate, show at once that *there is no comparison whatever between the two.* The author's words are these: "Unfortunately, the extraordinary superiority of the English manufacture, both in the material and workmanship is seen at a glance. The cutting edge in places approaches a mathematically straight line, whereas the German article shows an unevenness. That part which lies near the edge, which I will call the stropping zone, forms on the English blade an even band with parallel borders and the relatively shallow furrows, whereas the lower edge on the German knife forms an entirely irregular line and is covered with deep furrows." The use of Weiss's knives all over the Continent is a silent witness of their perfection.

Experiments show that if a cataract knife be put into cold water containing 1 per cent. of sodium carbonate, and be brought to a boil, and boiled for 15 minutes, no alteration whatever can be detected with the microscope, even if the boiling be repeated three times. But if the cold knife be plunged straight into boiling water, the edge is certainly affected for the worse. The microscope shows a large number of fine serrations. Schmidt recommends that every new knife be annealed, by bringing it to a boil from the cold, before it is used.

T. HARRISON BUTLER.

V.—COMPLICATIONS DURING AND AFTER THE EXTRACTION OF CATARACT.

- (1) Trousseau.—Imperceptible incurving of the flap, a cause of non-re-establishment of the anterior chamber after cataract operation. (Le recroquerillement imperceptible du lambeau, cause de non-rétablissement de la chambre antérieure après l'opération de la cataracte.) *Archives d'Ophthalmologie*, avril, 1910.
- (2) Le Roux, Henri.—About a case of collapse of the sclerotic during a cataract operation. *La Clinique Ophthalmologique*, 10 octobre, 1910.
- (3) Knapp, Arnold.—Glaucoma from adhesion of the lens capsule to the cornea. *Trans. Amer. Ophthal. Society*, Vol. XII, Pt. 2, 1910, p. 472.
- (4) Dupuy-Dutemps.—Late irido-choroiditis due to fistulisation of the cicatrix after cataract operation, and its treatment. (L'irido-choroïdite tardive par fistulisation de la cicatrice après l'opération de la cataracte et son traitement.) *Bull. et Mém. de la Société française d'Ophthalmologie*, T. XXVII, 1910, p. 139.

(1) Trousseau, of Paris, points out that a not infrequent cause of the non-re-establishment of the anterior chamber after cataract operations is, in the absence of an iritic or capsular inclusion, an imperceptible shrinking or incurving (*recroquerillement imperceptible*) of the upper edge of the flap. The condition, which can only be recognised by the binocular *loupe*, presents the appearance of a small groove in the superior border of the flap, usually in a portion only of its extent. The treatment which he has adopted, and which has met with immediate success, consists in passing a knife through the wound, or in simply opening it up with a spatula. The anterior chamber is re-established within 48 hours.

BERNARD CRIDLAND.

(2) Le Roux, of Caen, has added one more to the small list of published reports of this curious occurrence. He has operated on the second eye of the patient, reported in *La Clinique Ophthalmologique*, 10th January, 1908, with a perfectly similar result. If the reader will refer to THE OPHTHALMOSCOPE, 1908, p. 459, he will find an abstract of the case of the first eye, and for practical purposes may consider that the same account applies to the eye now reported. Le Roux, bearing in mind the opinion of Sirieys, that the collapse is due to the hypotonic action of cocain, used in this operation as little cocain as possible. The cataract was over-ripe and the sunken nucleus had to be fished out with a vectis.

What can be the cause of this collapse of the sclera? Chodin attributed it to congenital failure of elasticity. The author agrees with Terrien and Sirieys that this is not a satisfactory explanation. Neither congenital nor acquired loss of elasticity is sufficient to explain the diminution in volume of the eye. Sirieys supposes that a concentration of the vitreous is caused by the action of cocain. Cocain "by its vaso-constrictive action produces a kind of dehydration which is specially marked in old subjects who have sclerosed and rigid tissues and slowly developed, very hard senile cataracts."

But here is a young and healthy man (no sign of diabetes or other cause for the cataract) with rapidly developed cataracts. The cocain explanation hardly seems to hold good. There appear to be two other explanations.—(1) Granting that the presence of cataracts in a man of 32 years is likely to depend upon some pathological conditions of the eye membranes, and taking the fact that

at the operation the amount of aqueous which escaped seemed to be abnormally large, is it possible that the combination of large loss of fluid with a pathological condition of the eye membranes might account for the collapse? Well, ophthalmoscopic examination revealed a clear vitreous and nothing special about the fundus except a crescent at the lower part of the disc, (2) An explanation offered by L. Dor, namely, that a part of the large quantity of liquid which flowed from the eye after the section was not aqueous but quite liquefied vitreous. The author seems, in the meantime, to accept this latter explanation.

ERNEST THOMSON.

(3) **Arnold Knapp**, of New York, reports six cases in which glaucoma followed adhesion between lens capsule and cornea. Of these, three were the result of accident, and the others followed removal of senile cataract by the combined operation. As regards the last group, attempts were made to divide the adhesion in all three cases, with an excellent result in one instance. The patient, aged 75 years, was found to have high tension a couple of months after a successful extraction with iridectomy. A band of adhesion at the outer column of the iris coloboma, which was found to be adherent to the corneal incision, was divided with a knife-needle. Tension became normal; but a month later, the eye was again hard. The strand was then drawn out with a Tyrrel's hook and divided; the adjoining capsule was cut with *pince-ciseaux*, causing slight prolapse of the vitreous. The band has not reformed. The tension is normal. Vision is undisturbed.

Knapp remarks that in cases such as he describes preventive treatment is all-important. The condition is liable to occur when the extraction has been combined with iridectomy, and is facilitated by certain methods of opening the capsule. The greatest advantage of the simple operation is the avoidance of capsular complications. Delayed union naturally predisposes to the accident. Treatment after the condition has occurred is to divide the adhesion. If the latter be broad, the operation is both difficult and unsatisfactory. On the other hand, when the band is narrow, it can readily be divided in such a way as to prevent reunion, and the glaucoma is then cured.

SYDNEY STEPHENSON.

(4) In recent years an increasing amount of attention has been paid to those forms of irido-cyclitis which are liable to develop some time after the removal of cataract. Such inflammations are often very formidable. They may entail total loss of the eye that has been operated on, and may even lead to sympathetic ophthalmitis of the other eye. Morax and Duverger have clearly differentiated between this form of delayed irido-cyclitis and primary irido-cyclitis due to surgical inoculation. The former does not appear until the third or fourth day, or later, after operation. Apart from an accidental re-opening of the wound, three kinds of infection, according to Duverger (*Thèse de Paris*, 1909), may give rise to these delayed inflammations:

(1) The introduction at the time of operation of micro-organisms that develop only after a long incubation (Morax).

(2) Endogenous infection by a general infection becoming localized in the eye by the traumatism inseparable from the operation.

(3) Exogenous infection gaining the interior of the globe through a fistulous cicatrix.

The third of the foregoing causes (much the commonest cause of delayed irido-cyclitis) is the only one discussed by **Dupuy-Dutemps**, of Paris, in the present communication.

The author gives full details of four cases where irido-cyclitis supervened some time after operation (three extractions, one after-cataract). In all these cases he adopted conjunctival autoplasty, as a rule with the happiest results.

The method employed was as follows.—Local anæsthesia by cocaine and adrenaline, or, in markedly inflamed eyes, by general narcosis. With scissors, the conjunctiva was detached nearly level with the limbus around one-third or one-half of the circumference of the cornea, according to circumstances, and the flap thus marked out was freely dissected up from the globe for a distance of a centimetre from the edge of the cornea. By several snips of the scissors, the conjunctiva was freed superficially towards the upper cul-de-sac, so as to render it capable of displacement without dragging. A couple of sutures were passed as shown in figure 1. The fistulous point and

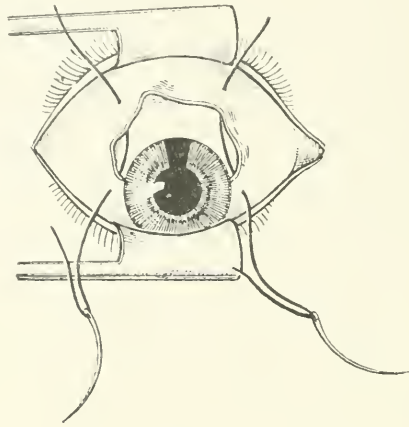


FIG. 1.

its neighbourhood were freshened by scraping with a small knife and the fistula was then treated with the galvano-cautery, with or without perforation of the anterior chamber. The operation was completed by tying the sutures as shown in figure 2, so as to cover the upper third of the cornea with conjunctiva. The stitches were taken out on the fifth day.

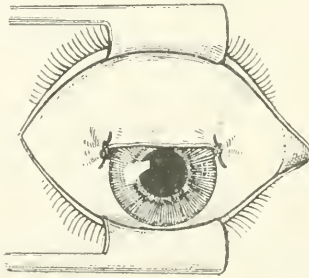


FIG. 2.

The operation described above appears to be the best treatment for irido-cyclitis due to fistulisation of the surgical cicatrix. The infected canal is sterilised by the cautery, and the conjunctival covering opposes an effectual barrier to new microbic invasion. The tissues of the eye, thus protected against re-infection, may by their proper means of defence, triumph over the

micro-organisms that have already gained entrance; much in the same way as we cure an acute adenitis by dressing and protecting the cutaneous sore that has caused it. The earlier the intervention the better is likely to be the result; but if perception of light remains, however severe the case, the method should, in Dupuys-Dutemps' opinion, be tried. SYDNEY STEPHENSON.

VI.—THE RECOVERY OF CATARACT, SENILE AND OTHERWISE.

- (1) Becker, F.—Do spontaneous recoveries of senile cataract occur? (*Kommen bei seniler Kataract Spontanheilungen vor?*) *Wochenschrift f. Therapie u. Hygiene des Auges*, 13 Januar, 1910.
- (2) Mac Whinnie.—Cataract absorption, with report of a case. *Ophthalmic Record*, May, 1910.
- (3) Dunn, Percy.—On so-called "second sight"—its features, varieties, and causes. *Clinical Journal*, June 1st, 1910.
- (4) de Saint-Martin.—A case of total spontaneous absorption of a traumatic cataract caused by a foreign body in the lens. (*Un cas de résorption totale, spontanée d'une cataracte traumatique par corps étranger du cristallin.*) *Annales d'Oculistique*, novembre, 1910.
- (5) Turner, Arthur J.—Case of dislocation of a senile cataract. *British Medical Journal*, October 8th, 1910.

(1) Becker, of Düsseldorf, relates the case of a lady of sixty who presented lental striæ running from the equator to within the pupillary area. After correction of the hypermetropia, the vision of both eyes became $\frac{5}{8}$. Two years later, on examination with undilated pupil, no opacities were discovered in the lenses. Her general health had improved very much during the interval. It is not stated if the pupils had diminished in size.

W. B. INGLIS POLLOCK.

(2) Mac Whinnie, of Seattle, records the case of a man, 40 years of age, who gave a history of specific infection four years before he came under observation, with striæ (five) in the right eye and striæ and vitreous opacities and choroido-retinitis in the left eye. R.V. = $\frac{6}{61}$; L.V. $\frac{6}{15}$. Under treatment by injections of benzoate of mercury (one cgm. daily) for twenty days, the sectoral opacities in the left eye entirely disappeared with vision $\frac{6}{6}$ (ijj) and J. 1 at 15". In the right eye only small and peripheral parts of two sectors were visible.

The author reviews other methods of producing absorption of striæ.

J. JAMESON EVANS.

(3) This article by Dunn, of London, on the varieties and causes of "second sight," hardly calls for detailed abstraction in a special journal. The varieties of "second sight" are due to: (1) lental myopia occurring in an early stage of the cataractous process, (2) the spontaneous cure of cataract, (a) spontaneous dislocation, (b) intracapsular absorption. The cataracts referred to are chiefly of the senile type, but mention is made of a case by Solomon in 1858, and of two cases by Kolscher, in which congenital cataracts became absorbed. In the former, absorption took place in the course of a

month's treatment by atropin, while the infant was at the breast; in the latter, five years were required. The references to these cases are not detailed by Dunn.

The article contains interesting accounts of individual cases of such "miraculous" cures, and the necessary warnings as to possible ill-results of dislocated lenses.

ERNEST THOMSON.

(4) **de Saint-Martin** records the case of a child, aged 6, whose left eye was injured by a piece of stone, which penetrated the cornea near its centre and remained embedded in the lens, causing a traumatic cataract. Under treatment with atropine, the lens was totally absorbed in two months, and the stone, which remained balanced on and adherent to the pupillary edge of the iris, was subsequently removed through a corneal flap incision, leaving a pupil, round, active, and quite free from *débris*. The author strongly favours expectant treatment in cases of non-infected traumatic cataract.

R. J. COULTER.

VII.—THE SPECIFIC ACTION OF LENS ALBUMEN.

Krusius, F. — Studies of hypersensitiveness concerning the biological functions of lens albumen after cataract extraction and communications about the specific action of lens albumen and its relationship to other naturally denatured albumins of the ectoderm. (*Ueber empfindlichkeits Studien zur biologischen Wirkungsmöglichkeit des Linseneiweisses und seine Beziehungen zu andern natürlich denaturierten Eiweissen des Ektoderms.*) *Bericht der Ophthalmologischen Gesellschaft, Heidelberg, 1910.*

Krusius (Marburg).—If a guinea-pig be injected with any biological albumin, after a longer or shorter interval a prolonged phase of hypersensitiveness sets in. A second injection of the same albumin will now cause serious toxic symptoms. The question to be answered is—Can sufficient absorption of antigen from the eye take place to cause a similar condition of anaphylaxis? Uhlenhuth has shown that lens albumin is always a foreign albumin, and that the lens albumin of all animals possesses the same biological property in this respect. Injection of lens albumin from the same animal can cause antibodies to be formed. This is a manifestation of the so-called organ-specificity. Krusius concluded that:

1. The sensitizing of the whole body from the eye is possible.
2. In guinea-pigs this has been determined for the inactivated ox serum, the foreign pig's lens, and the guinea-pig's own lens.
3. In specifically sensitized guinea-pigs symptoms of hypersensibility can be originated from the eye.
4. This has been determined for the antigen of ox serum, for pig's lens, and for guinea-pig's lens.
5. It is possible specifically to sensitize a guinea-pig from one eye, and from the other eye, by reinjection, to produce specific intoxication.
6. The possibility of an enteric sensitizing by lens albumin could not be established in guinea-pigs.

The clinical point must be noted that *it is possible in guinea-pigs, by*

discission of one lens to produce in the whole body such a condition of hypersensibility that the absorption of lens albumin from the second eye induces a definite general toxæmia.

Krusius has further determined that :

1. Lens albumin acts biologically as foreign albumin, yet has a slight biological action like blood serum—that is to say, the organ-specificity is only relative.

2. The chief organ-specific action lies in the nucleus ; the specific action is mostly found in the capsule and periphery.

3. The organ-specific action is only relative, and seems to play an important part in the chemical structure, independently of the embryonic relationship, because there are closer relationships between these and the lenses of cattle.

4. Ectodermal structures, such as nails and hair, contain antigenic albumin.

5. The ectodermal horny structures also act as antigen against the same species of animal.

6. The albumins of the ectodermal horny formations of different species of animals have a similar biological action.

7. The albumin of these ectodermal structures has a second action similar to that of the animal's blood.

This peculiar position of the lens and ectodermal horn formations determined by biological reaction means a natural denaturing produced during development, a kind of degeneration of an albumin which was in the mother cell originally anti-specific.

T. HARRISON BUTLER.

VIII.—INSTRUMENTS.

(1) **Moretti, E.**—A needle-hook for discission or lanceolate synechotome. Some considerations on the capsulo-lenticular extraction of cataract according to the method of Gradenigo. *Annali di Ottalmologia*, Vol. XXXV, Fasc. 10-11, p. 799.

(2) **Tooke.**—A new forceps for the removal of the anterior lens capsule. *Ophthalmic Record*, May, 1910.

(1) The most interesting part of this article by **Moretti**, of Milan, is to be found in the considerations on Gradenigo's operation (zonulotomy, total extraction of the crystalline lens). This operation, submitted to trial in the service of Denti, at the Milan Hospital, has shown that *audaces fortuna juvat* is not an axiom, especially in ocular surgery.

Recognising the necessity of having sometimes to operate upon secondary cataract, Moretti has devised a new instrument, a lanceolate needle provided with an arrangement for forming a hook, thereby allowing it to be used also as a synechotome. The design of the little blade resembles the point of Reverdin's needle, open at the moment it takes the thread. One may enquire if the discontinuity does not involve a risk of catching the lips of the small corneal wound at the moment when it is withdrawn. Taylor's needle (for incising the iridic angle) has always given us full satisfaction for certain discissions and synechotomies, its shank preventing also the emptying of the anterior chamber.

A. ANTONELLI.

(2) The capsule forceps devised by Tooke, of Montreal, have the extension blades fixed at an angle of 120° to the handles. These blades are concave below, allowing of uniform pressure over the whole of the lens and zonule, and therefore less liable to produce dislocation of the lens than when all the force is exerted at one point only, as in the case of the cystotome. At the toe and heel of these blades are fine interlocking teeth, the intervening unarmed parts of the blades measuring 5 mm., which is calculated to afford a clear pupillary area. Tooke warns operators against its use in refractory patients, as well as in cases of hypermature cataract with enfeebled and degenerated suspensory ligament.

J. JAMESON EVANS.

IX.—MISCELLANEOUS COMMUNICATIONS.

- (1) Killick, Charles.—An interesting case of congenital cataract. *British Medical Journal*, February 5th, 1910.
- (2) Salus, Robert.—On secondary glaucoma due to cataracta senilis intumescens and its treatment. (Ueber das Sekundärglaukom durch Cataracta senilis intumescens und seine Behandlung.) *Klin. Monatsbl. f. Augenheilkunde*, August, 1910.
- (3) Thierfelder, M. U.—On a case of phakocoele with tuberculosis of the cornea with its anatomy. (Ueber einen Fall von Phakokele bei Hornhauttuberkulose nebst anatomischen Befund.) *Inaugural Thesis*. Leopold Voss, Leipzig, 1910.
- (4) Harman, N. Bishop.—(1) Hereditary anterior polar cataract and microphthalmia. (2) Hereditary posterior polar cataract. *Trans. Ophthalmological Society U.K.*, 1910, Fasc. 2.
- (5) Harman, N. Bishop.—Polar lens defect (? pseudo-lenticonus posterior). *Trans. Ophthalmological Society U.K.*, 1910, Fasc. 2.
- (6) Collins, E. Treacher.—Lenticonus posterior with opaque membrane behind the lens. *Trans. Ophthalmological Society U.K.*, 1910, Fasc. 2.
- (7) Gifford, H.—An unusual form of Vossius' lens ring. *Ophthalmic Record*, August, 1910.
- (8) von Rohr, M.—On Gullstrand's cataract lenses, with especial reference to the correction of postoperative astigmatism. (Ueber Gullstrandsche Staarbrillen mit besonderer Berücksichtigung der Korrektur von postoperativen Astigmatismus.) *Bericht der Ophthalmologischen Gesellschaft, Heidelberg*, 1910.
- (9) Stanculeanu, G., and Rasvan, N.—Experiments with mydriatics and myotics especially for the extraction of senile cataract. (Versuche ueber Mydriatica und Miotika insbesondere für die Operation seniler Staare.) *Bericht der Ophthalmologischen Gesellschaft, Heidelberg*, 1910.
- (10) Stanculeanu and Mihail.—On the pathological anatomy of the extracted anterior capsule of senile cataract. (Ueber die pathologisch-anatomischen Befunde an der extrahierten vorderen Kapsel seniler Staare.) *Bericht der Ophthalmologischen Gesellschaft, Heidelberg*, 1910.

(1) The moral of **Killick's** case is that a result which may seem very unsatisfactory to the surgeon may be, to the patient, most successful.

The case was one of double congenital cataract: one eye had been operated upon, and the eye had become phthisical. The other eye had also been operated upon and the iris had become drawn upwards. The eye appeared at least fairly healthy. T.=? V.A.=p.l., and projection good. An iridectomy was performed, and although the patient (female, aged 36 years) was only enabled to see large objects with + 1 D., she was much contented with the improvement in her vision, an improvement so great that she could find her way about alone and distinguish colours. Killick hopes for further improvement by another operation later on.

ERNEST THOMSON.

(2) **Salus** reports from **Elschnig's** *clinique* five cases of unilateral glaucoma produced by the swelling of a maturing senile cataract. In every case the fellow eye, which was free from cataract, had a very shallow anterior chamber. Two of the patients were glass-blowers. Posterior sclerotomy, preliminary to the extraction of the cataract, was performed in two cases with so much success that **Salus** recommends this procedure for all similar cases in which myotics fail to lower the tension. Posterior sclerotomy has the following advantages: it is a very simple, painless operation; it lowers the tension with certainty, if only temporarily; deepens the anterior chamber; and allows the operation for cataract to follow after a very short interval, and under practically normal conditions.

C. MARKUS.

(3) **Thierfelder** (Rostock).—Those who wish to inform themselves of the details of this condition will find in this thesis the details of several cases, and two plates illustrating the anatomical conditions found in one case examined by the author.

T. HARRISON BUTLER.

(4) The two cases by **Harman**, of London, should be studied in connection with the drawings which accompany the text. They belonged to families, the pedigrees of which were published in the *Transactions*, Vol. XXIX.

(5) The exact diagnosis was in doubt in **Harman's** case of a man, aged 66 years, who complained of failure of vision. No opacity in the lenses could be found by direct ophthalmoscopy, but with a plane retinoscopy mirror there was symmetrical central disturbance of the light reflex, which latter looked like light viewed through bottle-end glass. The disturbance was at the posterior part of the lens.

ERNEST THOMSON.

(6) **Collins**, of London, reports the case of a boy of eight years with R.V. = $\frac{6}{6}$ and L.V. = p.l. On examination with dilated pupil, an opaque grey membrane, densest in the centre, was seen immediately behind the lens. A red reflex could be obtained through the periphery of the lens. The presence of this opaque membrane behind the lens allowed of the contour of its posterior surface being distinctly seen. Instead of presenting the usual curvature of a normal lens, the centre part tapered backwards in the form of a cone. In his "Remarks," Collins states that the protrusions backwards of the posterior surface of the lens are met with in association with (a) inflammatory exudation in the anterior part of the vitreous, (b) in injuries rupturing the posterior capsule, (c) congenital malformations. The literature on the subject is referred to.

ERNEST THOMSON.

(7) **Gifford**, of Omaha, reports a case of a lens ring in a boy, aged 11 years, who was struck in the eye by a fragment of a dynamite cap. There was a non-penetrating wound of the inner limbus and adjacent conjunctiva, cloudiness of the neighbouring corneal tissue, and a small hyphæma. When the pupil was fully dilated on the second day a ring-shaped opacity, about 3 mm. in diameter, could be recognised in the centre of the anterior surface of the lens, and with a strong lens it could be seen that the ring was made up of fine dots, and also that there were innumerable fine opacities throughout the anterior surface

of the lens as far as the periphery to within the ring. In less than three weeks the opacities showed distinct signs of clearing up. V. = 20/30 +.

Vossius assumed that these ring opacities were due to the pupillary margin of the iris being pressed against the anterior surface of the lens by the cornea, while the other opacities were the result of degenerative changes in the capsular epithelium analogous to experimental contusion cataract. But Gifford's case shows that the changes can be brought about by a glancing blow by a small piece of copper, at the inner periphery of the anterior chamber—an injury which could not possibly have pressed the centre of the cornea against the iris. Gifford is inclined, therefore, to accept Hoeg's view, *viz.*, that the ring is the result of sudden increase of pressure in the anterior chamber which forcibly presses the iris against the lens and causes the ring opacities. The increased aqueous pressure is also assumed to be the cause of the opacities outside and within the ring.

J. JAMESON EVANS.

(8) At the congress in 1909 (*Bericht*, 1909, p. 25) von Rohr, of Jena, introduced this subject under the heading—"The Theory of Anastigmatic Cataract Lenses," and Hertel continued with a paper on "The Practice of Anastigmatic Cataract Lenses." This year von Rohr has developed the subject still further by introducing the correction of post-operative astigmatism. These new Jena lenses allow the aphakic individual to turn his eyes through nearly 30 per cent. each way and still get clear images. The drawback is the cost of the lenses, and also their weight. We obtained specimens for a patient who had no astigmatism, but he refused to keep them, as he said he saw no better than he did with his old glasses and thought that the new ones were not worth the extra cost. Gullstrand shewed that a positive spherical lens of high power could not be corrected for oblique rays. An aspherical surface must be used. The astigmatism at varying angles of obliquity is different for each angle with ordinary spherocylindric lenses. With Gullstrand's lenses the astigmatism is constant. The photographic plates which accompany the paper shew how superior in theory these lenses are to the old ones.

T. HARRISON BUTLER.

(9) It is well-known that ophthalmologists have employed mydriatics before operating for senile cataract but nearly all have now abandoned them. Plange, (*Klin. Monatsbl. f. Augenh.*, 1909, 11, 96.) describes his method. Atropine is placed in the eye some hours before operation. Just before the section is made, eserine is instilled. At the end of the operation, the eye is "drenched" with 1 per cent. eserine. This contracts the pupil. If not, it is repeated until the pupil is small. Eserine is used daily until the wound is healed. Then, atropine is substituted.

Stanculeanu and Rasvan, of Bucharest, have experimented to ascertain the facts of the antagonism of eserine and atropine. Eleven persons received two drops of 1 per cent. solution of atropine. In 6 to 10 minutes the pupil began to dilate and the maximum was reached in 15 to 20 minutes. The pupil contracted to normal in 7 to 14 days. Half per cent. solution of atropine sulphate was placed in the eyes of seven persons. Dilatation began in 6 to 10 minutes. Complete mydriasis was attained in 15 to 25 minutes. Six to nine days elapsed before the effect wore off. One-fifth per cent. solution acted as quickly as $\frac{1}{2}$ per cent., but the pupils were again normal in from 60 to 184 hours. A drop of 1 per cent. oily solution of eserine reduced this time to from 60 to 120 hours. In fact, it made little difference. Other experiments were conducted with other solutions. The authors concluded that eserine only controlled atropine for a short time, and that the atropine soon again gained the mastery. They therefore hold that atropine should not be used before cataract extraction.

Similar experiments with homatropine showed that eserine reduced the period of action from 36 to 60 hours to 20 to 50 hours. The authors conclude that homatropine is a suitable drug to use for extraction. They proceed as follows.—The evening before the operation two drops of 1 per cent. homatropine are instilled. The incision is made in the limbus. Then, the capsule is seized in the forceps, as large a grip as possible being taken. Lateral movements are made until the lens is dislocated into the anterior chamber, the capsule remaining unruptured(?) The lens is now delivered. Half per cent. oily solution of eserine salicylate is now instilled.

Experiments were also made with methyl bromide of atropine and with euphthalmine. The results resemble those with homatropine.

We can only conclude that the capsules at Bucharest are phenomenally tough!

T. HARRISON BUTLER.

(10) **Stanculeanu** and **Mihail**, of Bucharest, first give a summary of the work which has been done and then add the results of their own investigations. At Bucharest it is usual to remove the anterior capsule entire with a special form of capsule forceps. Thus the authors had abundant material at their command. The paper is purely histological and therefore not of general interest. Pathologists who wish to investigate this branch of the subject will naturally read it in the original. It is illustrated by four plates of microphotographs, all strikingly similar.

T. HARRISON BUTLER.

BOOK NOTICES.

Report of the Ophthalmological Congress at Heidelberg, 1910. (*Bericht über die sechs und dreissigste versammlung der Ophthalmologischen Gessellschaft, Heidelberg, 1910*). Redigiert durch A. WAGENMANN. Wiesbaden: Verlag von F. I. Bergmann. 1911.

The report of the annual meeting of the Ophthalmological Society, which met at Heidelberg in August, 1910, has just appeared in its well known-form. There are nearly 400 pages of written matter chiefly devoted to the papers read and the demonstrations held. At the end there are twenty-four plates, some of them coloured. They fully maintain that high standard which one associates with the annual *Bericht*. A list of members of the Society will be found at the end of the volume, but it contains few English names. The communications read will be abstracted in THE OPHTHALMOSCOPE in due course.

T. HARRISON BUTLER.

Handbook of Treatment for Diseases of the Eye. By Dr. CURT ADAM. With a preface by Prof. VON MICHEL, Berlin. Translated from the second German edition (1910) by WM. GEORGE SYM, and E. M. LITHGOW. London: Rebinan, Ltd. 1911. 264 pages, 36 illustrations. Price, 10s. net.

This handy little volume—for certainly it is not too large to go into an overcoat pocket—is one to which we desire to give a cordial welcome. It is addressed, according to the author's preface, to the "surgeon in practice," yet we venture to say that he would be a self-satisfied ophthalmologist who should declare himself none the wiser for its perusal.

The book sets out, not, indeed, to cover all the ground of ophthalmic therapeutics, an impossible task for a small book; but to give, in a definitive manner most suitable for the practitioner, the best recognised treatment under given circumstances. Treatment which is still on trial is mentioned but not detailed. Fortunately, the author has avoided the method of giving a mere list of diseases followed by the treatment, and has so planned his work as to give as much symptomatology and diagnosis, especially differential diagnosis, as the size of his volume will allow. With regard to differential diagnosis, one naturally turns to glaucoma as a kind of test subject. The author of this book is determined that it shall be no fault of his if mistakes are made between glaucoma and other conditions, and a reference to the remaining chapters will show that differential diagnosis is a strong point with him.

A mere short statement of the contents of a volume of this kind can give the prospective reader but little idea of the immense amount of information which he will find between its boards. After a few pages on methods of examination, comes a General Part which, commencing with remedies and their application, dressings, bandages, etc., goes on to the consideration of general treatment, the modern diagnosis and treatment of syphilis and tuberculosis, serum treatment, opsonins, Bier's method, sub-conjunctival injections, and narcosis. Scopolamine-morphine narcosis is fully described. Then follows the Special Part on the various eye diseases. This includes refraction and the prescribing of spectacles. The volume ends with useful chapters on First-Aid in ocular injuries—including a paragraph on compensation—with a list of 152 prescriptions, which the translators have very nicely cast into British form.

That this excellent volume contains some statements and opinions with which a reviewer may not agree goes without saying, but they are few in number. The statement that adrenal extract is perfectly safe in glaucoma, as it tends to lower tension, is, we think, of doubtful truth. The strength of cocaine employed for local anaesthesia (10 per cent.) is greater than is usual in this country. The condemnation of atropine in phlyctenular conjunctivitis and keratitis is a little difficult to understand. Injections of atoxyl are employed for pemphigus, but there is no warning as to the danger of this drug.

More than a mere word of praise is due to the translators. When we say that they have succeeded in abolishing almost all traces of German idiom from the text, have so carefully proofed their sheets that only a very few errors are to be found, and have at the same time turned out an eminently readable English book, we give them the highest praise that the reviewer can bestow upon the translator.

The publishers have produced a neat, clearly printed, clearly illustrated volume, albeit we think that in a second edition the paragraph headings here and there might be altered in such a way as to correspond accurately with the contents bill.

ERNEST THOMSON.

Functional Examination of the Eye, for Students and Physicians. (Die Funktionsprüfung des Auges für Studierende und Aerzte.)

By Dr. ANTON ELSCHNIG. Second edition. Leipzig and Vienna: Franz Deuticke, 1911. Price, 5 marks, or 6 kronen.

The publication of a work specially devoted to the functional examination of the eye scarcely needs to be justified, for although the subject is treated in more or less detail in every ophthalmological text-book, there is perhaps no department of eye-work which is so apt to receive less than its due share of attention. Even in hospital practice, where there are ample opportunities for

the cultivation of precise methods, the mere press of work often leads to carelessness, or at least incompleteness, in the details of functional examination.

In this book of less than two hundred pages Elschnig does not describe these methods in much greater detail than will be found in many of our best modern text-books; but those who have known the author as a teacher will be prepared to find the material treated in the clearest and most intelligible fashion. Here and there one feels a little disappointment at the omission of details which one looks for in such a special treatise, and also at the inclusion of irrelevant matter; but this does not detract greatly from the favourable impression left by the book as a whole.

The opening section, after an introductory discussion of the optical properties of lenses and of the eye, goes on to consider errors of refraction. This section might with advantage have been shorter. It occupies ninety-five pages, or practically half of the volume, and devotes a good deal of unnecessary attention to the prescribing of spectacles, and even to the fitting of frames. It is difficult to understand also why the objective estimation of the refraction, by retinoscopy, etc., should be relegated to the end of this section after the subjective methods of examination and the rules for the prescription of glasses have been discussed.

The succeeding chapters deal with the testing of the field of vision, of the colour sense, and of the light sense. The author seems to favour the Young-Helmholtz theory of colour vision, and the views of Hering are also referred to, but we could find no mention of Edridge-Green's theory or of his colour vision tests. A short but useful chapter follows on the methods of examining eyes of which the media are opaque.

Perhaps the best section is that concerned with the examination of ocular movements. This, we are told, has been rewritten for this edition. It treats briefly but adequately of the movements of the eyes singly and in association, of concomitant and paralytic squint, conjugate deviation and conjugate paralysis, the heterophorias, nystagmus, etc. Under the heading of disturbances of the associated movements of the eyes, a useful subdivision of these movements is made, into (1) *Spy movements* (*Spähbewegungen*), in which the patient directs his eyes to an object, such as the finger, placed in one position after another, (2) *Command movements* (*Kommandobewegungen*) where the eyes are turned in response to the orders, 'right,' 'left,' 'up,' 'down,' etc., (3) *Following movements* (*Führungsbewegungen*), the eyes being made to fix continuously the finger or other object carried slowly in all the different directions, and, (4) *Attention movements*, in which the patient tries to maintain fixation of the object while the head is passively turned in different directions. The first two are purely voluntary movements, the third is at least partly reflex, and the fourth is entirely reflex, and the possible value of such a distinction is indicated by the statement on another page that, in conjugate deviation, spying, command, and following movements towards the opposite side are weakened, while attention movements are retained.

The last chapter deals with the detection of the simulation of functional defects.

The author does not limit himself, in any part of the book, strictly to the details of functional testing, but touches briefly upon the ætiology and significance of the phenomena which may be observed. The methods described are only such as do not involve the use of expensive apparatus, and those of merely scientific interest are for the most part omitted. The author, indeed, follows the lines which he adopts in his teaching of the subject, and this is the best guarantee that only well-tried, practically useful methods are included.

In spite of the few omissions and defects to which we have called attention, this is a book which can be cordially recommended as a trustworthy guide to the functional examination of the eye. Misprints are very few, and the paper, type, and general style of the book are excellent.

A. J. BALLANTYNE.

The Treatment of Cataract. By LIEUT.-COL. HENRY SMITH, Indian Medical Service. Calcutta: Thacker, Spink, and Co. 1910.

As his best friends have always recognised, "Jullundur Smith," now transferred to Amritsar, is essentially a worker, not a writer. In the former capacity he stands in some respects supreme. His personal experience of over 24,000 cataract extractions has probably never been approached by that of any ophthalmic surgeon of any time. And this unrivalled experience has been gained by a general surgeon at an obscure town in the Punjab, which the surgeon by his fame transformed from the medical status of a second class civil surgeoncy into the Mecca for the blind of Northern India. Whatever view critics may hold of the value of Smith's intra-capsular operation—the present reviewer has always been against the method as the operation of election even in India—they must recognise that his work, as a whole, has appealed to the imagination of the people of India with extraordinary emphasis. In the book now dealt with we have the material for analysis by which to learn the secret of this immense appeal. Undoubtedly, a great factor is the comparative freedom from sepsis attained by the use of strong perchloride lotion. Another is the simplicity and freedom of the treatment. The patient is not worried by preliminary training or preparation, but is operated upon at once. During the operation he is allowed to look where he will, and to squeeze his lids together as he pleases. Afterwards, he is left to his friends, and on the first removal of the bandage, six or more days later, he is nearly ready to depart. He is not kept back and worried by a second operation for after-cataract. Doubtless, also, the freedom from after-cataract has been a great influence, inasmuch as early "needling" has not been a usual adjunct to ordinary extraction in India.

So much has been written of late by men who have visited Jullundur and worked there, that there is little to be added to the accounts already published of Smith's *technique* in the intra-capsular operation. And on this account the numerous graphic illustrations of the book by Dr. Derrick T. Vail, of Cincinnati, are perhaps of at least as much importance as the letter-press; The more so since Smith has always insisted upon the inadequacy of written descriptions of the operation. But the author has naturally a good deal to say on subjects other than his intra-capsular method. The book bears the impress of one who has read comparatively little, and who has rejected much of the little he has read. It has both the advantages and the defects of such acquirement of knowledge. It abounds in dogmatic assertions, more or less incorrect or controversial. But sprinkled throughout are hints and observations at least worth testing.

Among the varieties of cataract given in the first chapter there is no clear description of the Morgagnian cataract, so frequently met with in India. The intra-capsular extraction of intumescent cataract in acute glaucoma is advised, after the administration of a purge and the application of leeches. In a chapter on couching of the lens the statement (objected to by Elliot), is repeated, that atrophy of the retina is in time a sure result of this form of dislocation of the lens.

It is curious to find a recommendation of the instillation of atropine at least three times during the twenty-four hours preceding ordinary extraction (called here Daviel's operation). Also, that Smith operates in 1-2 minutes after a single instillation of cocaine, 4 per cent. solution. He is not an advocate of ambidexterity in operating.

The chapter on after-complications is very brief and sketchy. The author prefers the extraction of after-cataract to needling. He gives repeated expression to an extraordinary belief that the eye resents the presence in it of any capsule after extraction of the lens.

Captain Lister's report on the after-effects of vitreous escape, based on 98 cases collected in Smith's clinic, is reproduced as an appendix. Objection has already been taken to this report as possibly unfair and misleading (see *THE OPHTHALMOSCOPE*, Vol. VII (1909), p. 567, and it is a pity that no notice has been taken of this objection.

H. HERBERT.

NOTES AND ECHOES.

Death.

WE regret to announce the death, from pneumonia, of a well-known American ophthalmic surgeon, Dr. Charles J. Kipp, at the age of 72 years. A native of Germany, Kipp went to the United States at an early age. He graduated in medicine in 1861, and served as an army surgeon until the year 1868, when he decided to devote himself exclusively to eye and ear work, at Newark, New York. In 1900 he occupied the presidency of the American Ophthalmological Society. Dr. Kipp published many contributions to ophthalmology.

As we are going to press, we learn with much regret of the sudden death on March 23rd, of Thomas Reid, formerly senior surgeon to the Glasgow Eye Infirmary. Dr. Reid was in his eighty-second year. We shall publish some notes of his career in the next number of *THE OPHTHALMOSCOPE*.

* * * *

Appointments.

Mr. E. TREACHER COLLINS has been appointed an examiner for the Diploma in Ophthalmology of the University of Oxford for 1911 and 1912.

Dr. Percival J. Hay has been appointed medical referee under the Workmen's Compensation Act for County Court Circuit No. 16, with a view to being employed in ophthalmic cases.

The Philadelphia Polyclinic announces that Dr. James Thorington has returned to its ophthalmic staff, and will resume his course of lectures in the post-graduate school.

* * * *

Recent Wills

Mr. HENRY POWER, whose death we all deplore, left estate valued at £14,968 gross, with net personality £13,130.

Mr. James Thomas James, of Harley Street, London, whose death was recently announced in these columns, left estate valued at £39,711 gross, with net personality £39,417.

* * * *

London
Ophthalmological
Exhibition.

THE Ophthalmological Exhibition was held at the rooms of the Medical Society of London on March 10th and 11th last. A good many things of interest to ophthalmic surgeons were on view. Among the firms exhibiting were the Uni-bifocal Company, Limited, Reiner and Keeler, Limited, H. F. Angus & Co., C. W. Dixey & Son, Theodore Hamblin, Limited, the Ocentric Company, and Adam Hilger, Limited. Electrical apparatus was shown by Locke & Soares, Malcolm & Allen, Limited, and the Holophane Limited. A series of lectures and demonstrations were given by Mr. Leon Gaster, Mr. J. S. Dow, Mr. Val. H. Mackinney, Mr. F. J. Selby, and Mr. H. S. Ryland.

* * * *

Action for Negligence.

IN the King's Bench Division, before the Lord Chief Justice and a special jury, the trial was concluded on March 16th, of an action in which a Miss Markham sued a Mr. Abrahams, an optician carrying on business in Manchester, for alleged negligence, consisting in the fact that when she went to his shop and asked for spectacles that would improve her sight, he did not discover that she was suffering from conical cornea, which had since become serious. The jury found for the plaintiff, with £25 damages, for which judgment was entered, with costs. A full account of this important case will be given in the next issue of THE OPHTHALMOSCOPE.

* * * *

The Colour Vision
of Dogs.

IN the lecture room of Caius College, Cambridge, Miss E. M. Smith, formerly research student at Newnham College, recently described investigations with the colour vision of dogs. For over eighteen months tests have been applied to a large number of dogs. The first result attained appeared to be that in some dogs there was what corresponds to colour blindness in men, and others were so stupid that nothing could be done with them. Miss Smith concludes that a dog, in its normal or untrained state, cannot discriminate between colours as colours, but can discriminate between differences in brightness. Some dogs are particularly sensitive to red: certain individual dogs can, after a great deal of training, come to realise colour.

* * * *

**Medical Manifesto
against Education
Committee.**

AN important protest of medical men was published recently against the action of the Walthamstow Education Committee in appointing an ophthalmic surgeon from outside the borough, in direct opposition to the course which the doctors themselves considered proper. "It is obviously to the public interest," runs the manifesto, which contains forty-three signatures, "that the local doctors, upon whom the residents depend for treatment during illness, should maintain themselves in a high state of efficiency. This can only be done by constant practice and experience, and if the treatment of these children is given to others than the local doctors, they are by this means excluded from a large field of work and legitimate sphere of practice, to the ultimate loss of the community." This incident is of much importance at the present juncture, as showing the determination of private practitioners to defend their rights collectively.—*Medical Press and Circular*.

* * * * *

Blind Congress.

The Fourth International Congress for the Amelioration of the Lot of the Blind was held in Cairo from February 20th to February 25th.

The Committee of organization consisted among others of Dr. Ruffer, Dr. Milton, and Mr. MacCallan. Among the distinguished visitors to the Congress were M. le Ministre Van der Heuvel, Belgium; Dr. Landolt, France; Father Stockmans, Belgium; Miss Giffen and Mr. Holmes, America; Dr. Webster, of Beyrout, and many others.

The Congress was opened by Prince Fouad in the name of H.H. the Khedive. Various papers were read, some of which gave rise to lively discussion. An ingenious form of typewriter for the blind was exhibited by Mr. Holmes.

A large number of suggestions were made in various communications with reference to the prevention of blindness in Egypt and with reference to the betterment of the lives of blind people. Most of these suggestions were impossible from financial reasons, or were adapted to a degree of civilization among the mass of the population much higher than that which obtains at the present time. Dr. Nazmi Bey, however, made two useful suggestions, one with regard to the training of midwives, and the other with reference to the teaching of the principles of ophthalmic hygiene in girls' schools. These suggestions were duly transmitted to the Ministry of Education, and to the Department of Public Health by the Government representative on the committee.

The only definite resolution of the Congress was worded as follows:—

"Confiant dans la sollicitude du Gouvernement pour toutes les œuvres d'intérêt général et notamment pour celles qui ont en vue de prévenir la cécité et de poursuivre l'éducation des aveugles.

Emet le vœu.

Que l'initiative privés crée des institutions et des établissements en faveur des aveugles tant ceux des villes que ceux des campagnes ; qu'il soit fait appel pour leur venir en aide à la générosité des philanthropes indigènes et étrangers.

Que tous ceux qui exercent une influence par le peuple, et en particulier les chefs des diverses confessions religieuses s'efforcent de pénétrer les mères de familles de la nécessité de soigner dès le premier jour les yeux de leurs enfants."

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[TWO SHILLINGS.

CONTENTS.

Original Communications.—

	PAGE
1. George Coats, M.D., F.R.C.S., and J. Graham Forbes, M.D., M.R.C.P.—On the relation of the Meningococcus Intracellularis to Pseudo-Glioma	310
2. H. Grimsdale, F.R.C.S., and R. R. James, F.R.C.S.—A case of Cataract from an Electric Shock	315
3. H. S. Ryland.—Optical Problems in Ophthalmology: II. Reflection at Plane Surfaces	317
4. J. D. Rolleston, M.D.—Inherited Syphilis and Blue Sclerotics ...	321

Clinical Memoranda.—

1. Ernest Thomson, M.D.—On the Management of Presbyopia in certain classes of Workmen	324
2. Charles A. Oliver, A.M., M.D.—Clinical Study of the Ophthalmic Conditions seen in a case of Universal Congenital Atrichia ...	326
3. A. W. Stirling, M.D., C.M.—Nystagmus on closing Eye ...	327

Novelties.—

New Advancement Forceps for Squint. By W. H. Jewell ...	327
---	-----

Review.—

Conical Cornea. By Sydney Stephenson	328
---	-----

The Responsibility of Opticians	352
--	-----

Translation.—

The Ophthalmio-Diaphanoscope and its use in the different branches of Medicine. By Dr. Carl Hertzell	358
---	-----

Current Literature.—

I. The Intra-Ocular Circulation	368
II. The Ophthalmio-Diaphanoscope	371
III. Corneal Mycosis	372
IV. Tenonitis	373
V. Lymphorrhagia of the Fundus Oculi	374
VI. Spring Catarrh... ..	376
VII. An undescribed type of Orbital Inflammation	378
VIII. Remedies	379

Correspondence... ..	385
----------------------	-----

Book Notices	386
---------------------	-----

Notes and Echoes	388
-------------------------	-----

ORIGINAL COMMUNICATIONS.

ON THE RELATION OF THE MENINGOCOCCUS
INTRACELLULARIS TO PSEUDO-GLIOMA.*

BY

GEORGE COATS, M.D., F.R.C.S., AND J. GRAHAM FORBES, M.D., M.R.C.P.,

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HOSPITAL FOR SICK CHILDREN, GREAT
ORMOND STREET, ETC.

THAT metastatic ophthalmitis occurs with some frequency in epidemic cerebrospinal meningitis has long been known; that the meningococcus is capable of causing, in children, a metastatic ophthalmitis of pseudo-gliomatous type, without associated symptoms of meningitis, appears to have escaped recognition. We present some illustrative cases:

CASE I.—Simultaneous onset, without constitutional symptoms, of metastatic ophthalmitis and arthritis of the left wrist-joint. No history of specific infectious disease. Temporary improvement of the ocular symptoms under treatment, followed by retrogression. Excision. Primary seat of metastasis the retina. Meningococci recovered from the vitreous.

Irene C.—, aged 4½ years, was admitted to the Hospital for Sick Children on October 7th, 1910. On October 6th, without signs of general illness, the left wrist joint became swollen and painful; a doctor who was consulted observed pus in the anterior chamber of the left eye, and sent the child to the hospital. She had had none of the infectious fevers; the two other members of the same family were quite well; no fevers (including "spotted fever") were known to be prevalent in the neighbourhood.

The right eye was externally normal. In the left there was moderate conjunctival and episcleral congestion. The cornea was clear, the pupil fairly well dilated, and pus was coming forward through it into the anterior chamber. The child seemed to suffer little or no pain, and appeared to be in perfect health, head symptoms being entirely absent. The left wrist joint was swollen, but with little tenderness, and no redness of the skin; the arthritis subsided in about a week. On admission, the temperature was 102°F.; it dropped at once to normal, and never subsequently rose above 100°F. There was no history or evidence of vaginal discharge.

Under atropin and hot bathing, the congestion of the eye decreased and the pus in the anterior chamber became partially absorbed. After about a week, however, the hypopyon increased once more; the iris became very vascular, a large staphyloma gradually formed in the intercalary region above, and the pupil became vertically oval. The eye was accordingly excised on October 19th.

Pathological Examination.—The primary seat of metastasis was probably the equatorial region of the retina. In this situation the retina is deeply buried in purulent infiltration and practically destroyed. The vessels are greatly congested, and there is some laying down of organising material in their walls. Elsewhere also the retina is deeply infiltrated, and coagula and hæmorrhages are present in the subretinal space. The vitreous is full of pus and coagulum, and organisation is commencing in the vicinity of the ciliary body. The papilla is moderately swollen, and the nerve slightly hypercellular for a short distance above the lamina cribrosa. There is no inflammatory infiltration in the inter-vaginal space.

The choroid is practically free from infiltration; the ciliary body is only moderately inflamed, and chiefly in the pars plana. The iris is much destroyed and deeply infiltrated. At the sclero-corneal margin above, there is a large perforation of the sclera, into which the iris and anterior part of the ciliary body are prolapsed. The lens is ruptured at its upper equator. The cornea shows moderate infiltration and œdema.

Bacteriological Examination.—Immediately after excision, a specimen of the pus in the vitreous was obtained under aseptic precautions. It was very viscid, and yielded in film preparations a scanty number of Gram-negative diplococci, both intra- and extra-cellular, but chiefly the latter. By cultivation at 37°C. a pure growth was obtained on serum of a Gram-negative diplococcus, indistinguishable from the meningococcus. Growth failed to develop at 22°C.

Fermentation tests applied to the diplococcus yielded acid reactions with levulose, galactose, glucose, and maltose, but failed to ferment saccharose; they were therefore in accordance with the behaviour of the meningococcus.

* Read on March 21st, 1911, before the Pathological Section of the Royal Society of Medicine.

CASE 2.—*Metastatic ophthalmitis first noticed a week after the onset of arthritis in the left wrist joint. No history of specific infectious disease. Perforation of the globe at the equator. Excision. Metastatic retinitis. Meningococci in the vitreous.*

Bertie W —, aged 4 months, was admitted to the Hospital for Sick Children under the care of Mr. H. A. T. Fairbank, to whom we are indebted for permission to make use of the case. There was no history of specific infectious disease. No vaginal discharge. Three weeks previously a swelling had appeared on the dorsum of the left wrist; this had disappeared before the child was brought to hospital. A week later the left eye was noticed to be swollen. When seen a fortnight afterwards, there was considerable proptosis and a little chemosis. The globe was soft, the pupil contracted and bound down, the iris pushed forward against the back of the cornea. There was a yellowish reflex from behind the lens. Orbital incisions were made without result, and as the globe was beginning to become staphyломatous on the outer side, it was excised; in doing so, an extra-scleral abscess was opened into at the equator.

Pathological Examination.—This case also seems to be one of metastatic retinitis. Some scarcely distinguishable remains of the retina are present close behind the lens; in the posterior part of the globe it seems to have been entirely destroyed. The globe is filled with polymorphonuclear leucocytes.

On the inner surface of the choroid there is a thick layer of inflammatory cells, which is becoming invaded from below by numerous new-formed vessels. The choroid itself is congested and its stroma is more prominent and fibrous than normal; it shows, however, only a moderate amount of infiltration, except in its inner layers anteriorly.

The anterior portion of the ciliary body is moderately deeply infiltrated; the pars plana is broken up and destroyed, and from it dense masses of young cicatricial tissue stretch inwards, filling up the posterior chamber and replacing the anterior part of the vitreous.

The iris is congested and moderately deeply infiltrated, the infiltration being diffuse, not focal. On its posterior aspect the iris is extensively adherent, centrally to the lens, peripherally to organising membranes in the posterior chamber. A cicatricial membrane stretches across the pupil. The cornea is practically free from inflammation. Coagulum and leucocytes are present in the anterior chamber.

At the site of perforation, the pus forms an extra-ocular abscess, which is partially isolated by a condensation of the surrounding orbital tissues. Elsewhere the sclera is but little infiltrated.

Bacteriological Examination.—The pus is very viscid. Films, prepared with difficulty, showed Gram-negative intra- and extra-cellular diplococci in small numbers. Cultivations from the pus were made on serum and agar, and yielded at 37° C. a Gram-negative diplococcus, culturally and morphologically indistinguishable from the meningococcus. Subcultures were planted on serum and agar, but failed to grow on the latter medium. At 22° C. a very feeble growth was obtained on serum, not developing, however, in further subculture.

Fermentation tests yielded the following results at 37° C. :—

Saccharose	...	...	Galactose	...	...	+
Lactose	...	...	Maltose	...	...	+
Glucose	...	...	Levulose	...	...	+

(- = no change in reaction. + = acid reaction.)

Controls planted from a meningococcus obtained from the cerebro-spinal fluid of a case of post-basic meningitis yielded precisely similar acid reactions with glucose, galactose, maltose, and levulose, but no change with saccharose and lactose.

Further confirmation of the identity of the organism obtained in this case was kindly provided by Dr. J. A. Arkwright, of the Lister Institute, who submitted the diplococcus to cultural, fermentation, and agglutination tests. From these he concluded that the organism was a typical meningococcus. It produced acid in liquid media from glucose and maltose, and *not* from cane sugar. The agglutination with meningococcus serum was fair in 1 in 200 dilution and partial in 1 in 500 dilution. With normal horse serum control no agglutination was obtained.

CASE 3.—*Metastatic ophthalmitis of the right eye following measles. Eyes buphthalmic. Excision of right. Metastatic retinitis. Gram-negative diplococci with the morphological characters of the meningococcus found in the vicinity of the retina at the equator.*

Amy M —, aged 9 months, was admitted on July 31st, 1907, to the Royal London Ophthalmic Hospital under the care of Mr. J. Herbert Parsons, who has kindly permitted us to use the case. The right eye had been bad for six days, following upon an attack of measles. Both eyes were buphthalmic. In the right the eyelids were swollen, the conjunctiva injected, the cornea dull, the anterior chamber shallow. The iris-pattern was blurred and the pupil occluded. Under atropin, the pupil failed to dilate, and on Aug. 6th marked chemosis set in. The eye was excised the next day, and was found to be slightly adherent to the surrounding tissues.

Pathological Examination.—The globe measured antero-posteriorly 25 mm., vertically 23 mm., transversely 23.5 mm.; the cornea measured 13 mm. × 11.5 mm.

The retina is very deeply infiltrated throughout, but more especially about the equator, where it is entirely broken up and buried in dense collections of polymorphonuclear leucocytes. A considerable amount of pus is present in the subretinal space posteriorly.

The choroid is not so much inflamed as the retina, but shows a good deal of congestion and infiltration of rather diffuse type; the infiltration is most dense at the equator on the temporal side, and in this situation the sclera is also slightly infiltrated. The nerve is somewhat hypercellular for some distance above the lamina cribrosa, but not so far as the cut end. The intervaginal space is normal.

The ciliary body is moderately inflamed, chiefly in the pars plana. An extensive cyclitic membrane in an early stage of organisation is present in the posterior chamber. It completely invests the equator and anterior surface of the lens; the iris is adherent to it in its entire extent, and the pigment epithelium is dragged upon and distorted. The contents of the vitreous are still purulent and show no organisation except a very slight amount on the surface of the papilla.

The iris is congested and shows a moderate amount of diffuse infiltration; an inflammatory membrane is present on its anterior surface. The corneo-iridic angle is occluded, and the root of the iris is atrophic. These changes probably have to do with the buphthalmos, not with the panophthalmitis. The cornea is normal. The anterior chamber contains coagulum and a few leucocytes.

Bacteriological Examination.—In this and the following case the eyes were unfortunately fixed before cultures could be made. In the sections, diplococci are found in moderate numbers in the pus of the vitreous. They are especially concentrated in the vicinity of the retina at the equator, and are not found with certainty in the choroid. Morphologically, they show the typical characters of the gonococcus-meningococcus group. They are almost all intracellular, and some leucocytes are crowded with them. Swollen and degenerate forms are uncommon. They are exquisitely Gram-negative, giving up their colour even when the gentian violet is very imperfectly washed out of the nuclei.

CASE 4.—Metastatic ophthalmitis of the right eye following the onset of measles at an interval of a fortnight. Excision. Probably metastatic retinitis and choroiditis. Gram-negative diplococci morphologically similar to the meningococcus in the vitreous and subretinal space.

Rachel C—, aged 15 months, was admitted to the Royal London Ophthalmic Hospital on May 12th, 1907, under the care of Mr. W. Lang, to whom we are indebted for the use of the case. The child had suffered from measles three weeks before, and the right eye had been bad one week. The lids were swollen, there was chemosis and proptosis, the cornea was hazy and a patch of discoloured lymph covered the pupil. The eye was excised the next day.

Pathological Examination.—The retina is partially detached posteriorly, and is very deeply infiltrated. In places, especially about the equator, it is completely destroyed. Large hæmorrhages are present here and there in its substance and on its surface. The subretinal space is full of pus.

The choroid is very deeply infiltrated, except over a small area at the posterior pole. The infiltration is uniform and equal in all the layers. Over extensive areas the epithelium is stripped up by exudation, and at the equator the inner layers of the choroid are quite broken up, the choroidal and subretinal exudates being continuous. At the equator, also, the sclera is slightly infiltrated and loosened in structure.

The ciliary body is infiltrated chiefly in the pars plana. The vitreous and posterior chamber are full of pus, and in the posterior chamber there is a considerable amount of hæmorrhage. There is practically no organisation of the exudates.

The iris is rather densely infiltrated and some hæmorrhages are present in the stroma. The cornea is normal. A fibrinous coagulum, with a few leucocytes and red corpuscles in its meshes, occupies the anterior chamber.

Bacteriological Examination.—A Gram-negative diplococcus is present in the pus of the vitreous and subretinal space, especially about the equator of the globe. It is doubtful if it is present in the choroid. Its morphological characters are, in general, those of the gonococcus-meningococcus group, but many swollen degenerate forms occur. No capsule is visible. The cocci are found both within and without the cells, but are probably more frequently extra-cellular. In the anterior part of the vitreous they are much more scanty, and they are not found in the pus of the anterior chamber, iris, or ciliary body.

Remarks.

In two of our cases an organism was found identical in appearance, staining reactions, and cultural characteristics with the meningococcus. In the vitreous of the other two clinically similar cases a microbe was present with similar morphological and staining peculiarities; although in these instances no cultures were available, there can be little doubt that the organism in all four was the same.

Since none of these cases showed symptoms of cerebro-spinal meningitis, it appears that the meningococcus may give rise to a metastatic ophthalmitis unassociated with constitutional disturbance. Since also, according to our experience, the meningococcus seems to occur with considerable frequency in such cases, we are led to conjecture that it may play a chief, or probably a

specific, part in the ætiology of that form of metastatic ophthalmitis in children which goes by the name of "pseudo-glioma."* In addition to the evidence of our own cases, certain other considerations may be adduced in support of this conjecture.

(1) On *a priori* grounds there is much to be said in favour of regarding pseudo-glioma as a clinical and pathological entity, liable to be imitated, no doubt, by other forms of ophthalmitis, yet in the main well defined in type, and probably due always to the same cause. Our own cases were of somewhat greater severity than is common in pseudo-glioma, and in two instances a perforation of the sclera had taken place; had it not been so the eyes would not have been excised, and no opportunity would have been afforded of making an early pathological examination. Yet they conformed well to the general type; in Case 1 the symptoms, although very threatening at first, receded later, and the eye might perhaps have been saved but for the gradual formation of an intercalary staphyloma; in Case 2 the changes in the anterior part of the globe were insignificant, and the eye was lost owing to a perforation at the equator; in the other two cases also the anterior changes were not great, and the panophthalmitis was not of the severest type. According to Treacher Collins, the usual primary seat of metastasis in pseudoglioma is the retina; so it was also in our cases.

It might be supposed that the special clinical characteristics of pseudo-glioma are due, not to a specific organism, but to a difference in the vital reaction of the child's tissues; in other words, that pseudo-glioma is caused by the ordinary pyogenic organisms, but that the tissues of the child are capable of a more powerful resistance, thus overcoming the virulence of the microbes and modifying their effects. Cases of metastatic ophthalmitis from the ordinary pyogenic organisms seem to be rare in children, but in one case of streptococcal infection, which we had the opportunity of examining, there was no such modified reaction, the panophthalmitis being of a virulent type, with commencing ring infiltration of the cornea. It is doubtful, also, if traumatic infection of the vitreous runs a more favourable course in children than in adults.

(2) It is well known that in true epidemic cerebro-spinal meningitis a form of metastatic ophthalmitis occurs which has the characteristic clinical features of pseudo-glioma.† According to the descriptions of Axenfeld (*Arch. f. Ophth.*, Bd. XL, iii, p. 1 (110), 1894) and Uhthoff (*loc. cit.*), the ocular symptoms are first observed simultaneously with, or a few days after, the commencement of the meningitis. In some instances the disease begins insidiously with moderate injection and chemosis in one eye or much more rarely in both; in other cases the onset is threatening, but the symptoms soon subside. The signs of iritis are present and a hypopyon, usually transitory, may develop;

*In this paper we use the term "pseudo-glioma" in this limited sense, leaving out of consideration the other conditions which may be mistaken for glioma—persistent hyaloid artery, tubercle of the choroid, retinal exudative disease, etc.

†The following figures, quoted from the papers of Uhthoff (*Bericht. d. Ophth. Gesellsch.*, Heidelberg, Bd. XXII, S. 84, 1905) and Hanke and Tertsch (*Klin. Monatsbl. f. Augenh.*, Bd. XLV, ii, S. 545, 1907) show the frequency of this association: Knapp, 4 to 5 per cent.; Salomon, 2 in 141; Jedrzejewicz, 2 in 28; Schirmer, 3 in 30; Rudnew Burjew, 1 in 10; Göppert, 3 in 44; Radman, 3 in 61; Curtius, 7 in 200; Wilbrand and Sängner, 0 in 25; Heine, 5 in 100; Uhthoff, 4 in 100. Ballantyne (*Brit. Med. Journ.*, 2, 1907, p. 190) saw no instance in 73 cases. According to Uhthoff, the frequency may be stated roughly at from 4 to 5 per cent., with apparently considerable variation in different epidemics. Lees and Barlow ("Simple Meningitis in Children," Clifford Allbutt's *System of Medicine*, 1901, Vol. VII, p. 521) describe a case of posterior basic meningitis they had met with associated with pseudo-glioma, affecting the right eye only and dating from the onset of illness, which occurred three weeks after an attack of measles.

sometimes, however, the anterior parts of the eye remain entirely free from inflammation. In the vitreous, inflammatory exudates are formed, which rapidly become purulent, giving a characteristic yellow reflex from the depths of the eye. There is little or no pain. Perforation of the sclera occasionally occurs, but, in general, the form of the globe is preserved; as the inflammation subsides and the vitreous exudates organise, the lens and central portion of the iris are thrust forward, while the periphery of the iris is retracted. The globe becomes soft, and a secondary cataract may develop.

The above description might be applied word for word to an ordinary instance of idiopathic pseudo-glioma, and since the meningococcus has been found several times* within the globe in these meningeal cases, there seems considerable inherent probability of its being also the cause of idiopathic pseudo-glioma.

(3) Certain of the attributes of pseudo-glioma suggest an association with the meningococcus.

(a) Pseudo-glioma is a disease of childhood; so also, in the vast majority of cases, is cerebro-spinal meningitis.†

(b) In cases of pseudo-glioma perhaps the commonest history is of antecedent transitory head symptoms, such as screaming, vomiting, headache, convulsions, delirium, apathy, unconsciousness, "water on the brain," brain fever, &c.‡ It is probable that many of these cases are instances of sporadic or abortive cerebro spinal or post-basic meningitis, and that the meningeal and ocular symptoms are alike due to the meningococcus. A history of one of the exanthemata, especially of measles or of whooping cough, is also common. It is most interesting to observe that though the history was of measles in our third and fourth cases, yet the organism in the vitreous was the meningococcus; this seems very suggestive of a specific causal relation between the meningococcus and pseudo-glioma, and tends to show that the action of the exanthemata is preparatory, either by lowering the general resistance or by causing inflammation of the mucous membranes, and so opening up a path of invasion.

(c) In our first case there was an arthritis of the left wrist joint, and in our second a history of a former joint affection. The association of arthritis with pseudo-glioma has also been described by Nettleship (*Medical Times and Gazette*, I, 1880, p. 63). In epidemic cerebro-spinal meningitis and posterior basic meningitis, arthritis and peri-arthritis are occasional complications.§

(4) The finding of the meningococcus in the vitreous, apart from symptoms of cerebro-spinal meningitis, is not an isolated observation. The same organism has been found in the naso-pharyngeal secretion in about 10 per cent. of normal persons who have been in contact with cases of cerebro-

* E.g., Axenfeld (footnote in a paper by Haglund, *Klin. Monatsbl. f. Augenh.*, Bd. XXXVIII, Beilageheft, S. 72, 1900); Wintersteiner (*Wien. klin. Wochenschr.*, S. 996, 1901); Uthoff (*loc. cit.*); Mayou (*Roy. Lond. Ophth. Hosp. Rep.*, Vol. XVI, p. 565, 1906); Hanke and Tertsch (*loc. cit.*); McKee, *Ophth. Rec.*, Vol. XVII, p. 438, 1908.

† Hirsch, A., *Handbook of Geogr. and Histor. Path.*, New Sydenham Soc. Trans., 1886, p. 568. Of Ballantyne's cases (*loc. cit.*) 81.5 per cent. were under 21 years of age. In the Upper Silesian epidemic 90.5 per cent. of the patients were under the age of 16 (Uthoff, *loc. cit.*).

‡ Nettleship (*Transactions Ophthalmological Society*, p. 36, 1883), found such symptoms in 8 out of 27 cases; Treacher Collins (*Royal London Ophthalmic Hospital Reports*, Vol. XIII, p. 368, 1893), in 6 out of 11.

§ Lees and Barlow (*loc. cit.* p. 534). Ormerod (Epidemic Cerebro-Spinal Meningitis. Clifford Allbutt's *System of Medicine*, Vol. I., p. 669, 1901). Still mentions the occurrence of inflammation about the joints in 4 out of 40 consecutive cases of posterior basic meningitis (Allchin's *Manual of Medicine*, Vol. I, p. 193).

spinal meningitis.* It has also been found in the conjunctival sac of persons who have had no communication with cases of that disease.†

Summary.

We have found the meningococcus in four cases of metastatic ophthalmitis of pseudo-gliomatous type, and are led to believe that a specific causal relation may be established between this organism and pseudo-glioma. Apart from our own observations, we base this opinion on the following considerations:

(a) Pseudo-glioma is a well defined clinical entity, and is therefore not unlikely to be due always to the same organism.

(b) A form of ophthalmitis identical with pseudo-glioma occurs in from 4 per cent. to 5 per cent. of cases of epidemic cerebro-spinal meningitis; the meningococcus has been recovered from the eye in such cases. Pseudo-glioma and cerebro-spinal meningitis are both diseases of childhood and both are sometimes associated with arthritis.

(c) In idiopathic pseudo-glioma a history of head symptoms, probably due to meningitis, is very frequent; two of our cases prove that even when the history is not of head symptoms, but of measles, the pseudoglioma may still be due to the meningococcus.

A CASE OF CATARACT FROM AN ELECTRIC SHOCK.

BY

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CATARACT from the effects of lightning stroke has been recognised for many years. Cataracts from electric shocks are much less common, presumably because the strength of the industrial current is generally so much less than that of lightning. It seems probable, however, that as large electric undertakings become more numerous, these accidents will also increase in number. At present there are very few recorded. It is therefore of some importance to place on record every case, so that it may be a guide and help in prognosis.

T. M—, aged 40 years, an engine driver in the employ of the London, Brighton, and South Coast Railway, was admitted into St. George's Hospital, London, on May 22nd, 1909, under the care of our colleague, Mr. H. S. Pendlebury, with the following history:

A portion of the line of the Brighton and South Coast was undergoing electrification. T. M— was on an engine, which was moving slowly near Victoria Station, and he climbed on to the top of the tender. He remembered nothing more until he found himself in Hospital.

*Lingelsheim.—*Deutsche med. Wochenschrift*, Juni 29 and August 3, 1905. Quoted by Gordon, *Report to Local Government Board on the Micrococcus of Epidemic Cerebro-spinal Meningitis, etc.*, 1907. Goodwin and v. Sholly. *Journal of Infectious Diseases*, Supplement, February 2, 1906. Quoted by Gordon.

†Brons (*Klin. Monats. f. Augenheilkunde*, Bd. XLV, Heft i, 1907, S. 1. Associated with the pneumococcus in a case of keratomalacia), McKee (*Ophthalmic Record*, September, 1908, p. 438. Normal Conjunctiva.) Lutz (*Klin. Monatsbl. f. Augenheilkunde*. Bd. XLVIII, i, S. 636, 1910.) Case of Chronic Conjunctivitis.

It seems probable that either his cap or his ear came into contact with a live overhead wire.

On admission, it was noted that the man was only half-conscious. There was extensive singeing of the eyebrows and moustache, and serious burns on the right ear, cheek, and nose; on the sole of the right foot was another large and deep burn. The boot on this foot was burst and scorched, and is now preserved in the Hospital museum.

Temperature, 98°F. ; pulse, 70 per minute.

The burns healed slowly, and by July 6th he had so far improved as to be able to go to a convalescent home. When he returned thence a fortnight later, he complained of blurring in the right eye, and was referred to the ophthalmic department. We then noted that the pupils were unequal, the left being rather smaller than the right, both were active; all other external points normal; the tension was normal. R.V. $6/9 + 0.5$ D. sph. Hm. = $6/6$ partly. L.V. $6/5 + 0.5$ D. sph. Hm. = $6/5$.

On the anterior cortex of the right lens we noticed a good deal of fine stippling, arranged roughly in a ring, leaving the central and peripheral zones comparatively clear. In the left lens there were a few similar dots, arranged in a similar figure. The fundi, which could be well seen, showed no abnormality.

The opacity in the lenses gradually increased, and in May, 1910, the right lens was practically mature and vision in the left eye had sunk to $6/12$ partly. The opacity in this lens was apparently chiefly in the anterior cortex, as in the other eye, in the earlier stages.

In the end of May, a simple extraction was performed on the right eye. It was noted that the lens was rather sticky, and some soft cortical matter remained behind. It was necessary to divide this before good vision could be obtained, but the result was good. On September 7th, 1910, R.V. $+9.0$ D. sph. $+2.0$ D. cyl. axis 20° = $6/5$.

Remarks.

We have been able to collect the following cases:—

(1) **Brixa.** (*Klin. Monats. für Augen.*, Nov., 1900.) The patient was burnt on the side of the nose and foot in July, 1897. Two months later there was considerable opacity in the anterior cortex of both lenses, which gradually became mature.

(2) **Desbrieres and Bargy.** (*Ann. d'Oculist.*, Feb., 1905.) In this case there were numerous dots and striæ, but the lenses never seem to have become totally opaque.

(3) **Ellet.** (*Ophth. Record*, Jan., 1906.) The accident took place in April, 1905. The anterior cortex was noted to contain opacities in July and the lens became mature by September. Current 500 volts.

(4) **Dor.** (*La Clinique Ophthalmologique*, Vol. XV, p. 141.) There was noted at first intense ciliary disturbance. It was diagnosed as iritis with hypopyon, although the hypopyon seemed to be rather an exudate than true pus. The lens became opaque afterwards. Current 13,400 volts.

(5) **Komoto.** (*Klin. Monats. für Augen.*, 1910, p. 126.) The author reports two cases. In the first the shock seemed to have been received actually on the cornea. The second was struck on the forehead and left hand. In this case the lenses gradually became completely opaque and were extracted. The lens and capsule were examined. Current in each, 11,000 volts.

(6) **Bichelonne.** (*Annales d'Oculistique*, August, 1910.) In this case the

current of 30,000 volts passed through the patient, burning his right foot, neck, and head. The right lens after five months, began to show opacities and in ten months, became quite opaque.

(7) **Dalen.** Referred to in *THE OPHTHALMOSCOPE*, 1910, p. 659-660. Compare also the experimental researches of Hess and Kiribuchi.

OPTICAL PROBLEMS IN OPHTHALMOLOGY.

BY

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II.—Reflection at Plane Surfaces.

LET S in fig. 8 be a point source of light and $W W$ be the waves radiating from it. Also let $M M$ be a plane reflecting surface facing S ; then if we take a particular wave $X X$ we find that it would have reached the position shewn by the dotted line had the mirror not been in place; but on meeting the mirror each part of the wave rebounds as far in the direction $B A$, as, but for the presence of the mirror, it would have travelled in the direction $B C$. The wave therefore, instead of having the form $X X$ has the form $X' X'$. $X X$ and $X' X'$ are, however, of exactly the same form but reversed since $B' B''$ is common to both waves and the distances $A B$ and $B C$ are equal. The wave after reflection therefore appears to radiate from the point S' termed the image of S which is as far behind B on the reflecting surface as S is in front. We thus obtain our first law of reflection which may be stated as follows.

The perpendicular distance from a plane mirror, of any point on the image formed by it, is equal to that of the corresponding point of the object, but on the opposite side of the mirror.

From fig. 8 it is evident that an eye E observing the image S' will receive the light apparently from S' but actually from S along the path $S N$, $N E$, since $S N$ is a radius to the waves $W W$ (or incident waves) and $N E$ is a radius to $W' W'$ (or reflected waves). If we draw a line $N' N$ parallel with $S B S'$ at right angles with the surface it is clear that the angles i , r , i' , and r' are equal. As this is true for any position, we obtain our second law of reflection.

The angle between the direction of the reflected light and the normal is equal to that between the direction of the incident light and the normal but upon the opposite side of the normal. (Any line $N N'$ at right angles with the surface is termed a normal to the surface. The term "ray" used in text-books is equivalent to the term "direction" or path of the light used here.)

To obtain our third law of reflection we have only to remember that the waves are spherical or parts of spheres. Hence the reasoning used in the case of a plane applies also to space. That is to say, if we imagine the direction $S N$, fig. 8, to be at an angle with the plane of the paper but meeting the paper at N , the direction $N E$ will make the same angle with the paper on the opposite side. Hence we obtain our third law of reflection.

The incident direction, the normal to the surface, and the reflected direction are all in the same plane, which is at right angles with the surface.

When light meets a plane surface at an angle it is deviated, and the amount of deviation is the angle contained by a straight line (180°) less the angles of incidence and reflection; but since these are equal we will call the angle of incidence i , and the deviation D is

$$180^\circ - 2i \quad \dots \quad \dots \quad I$$

see fig. 9, where $A B C$ is the mirror, $I B$ the incident direction, $N B$ the normal and $E B$ the reflected direction. Now let the mirror be turned to the

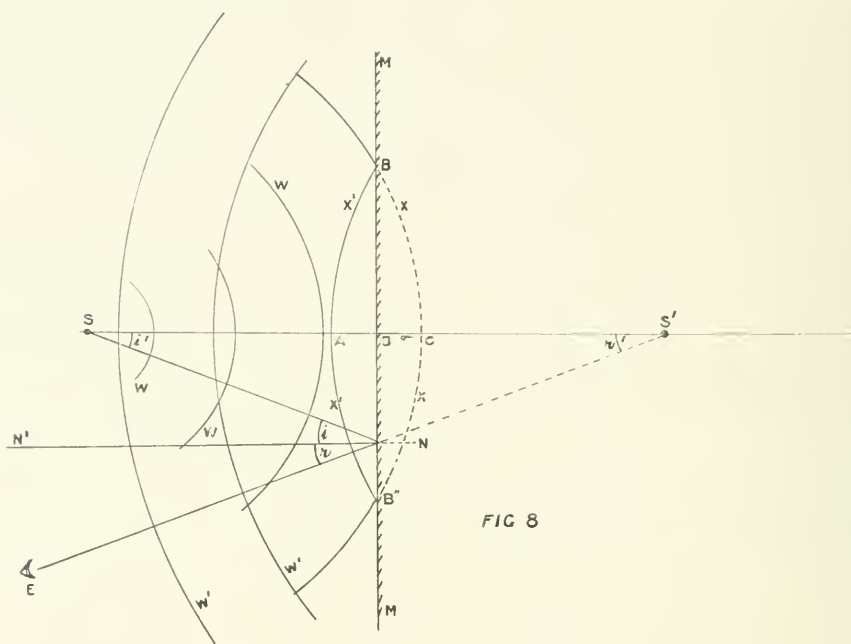


FIG. 8

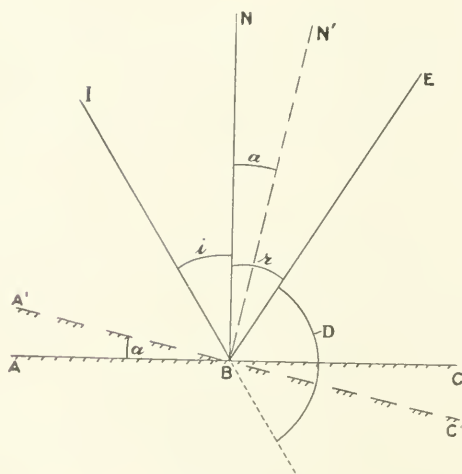


FIG. 9

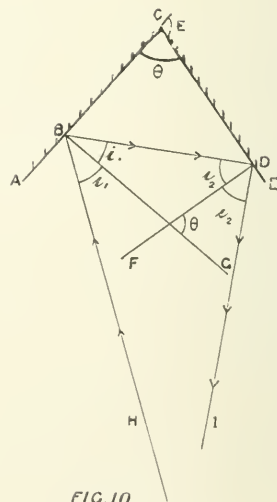


FIG. 10

position $A' B C'$, through an angle α , $I B$ remaining as it is, we shall then have a new normal $N' B$ making the same angle, α , with the first normal as

the new position of the mirror makes with the old: that is the angle of incidence is increased by a . The deviation therefore becomes

$$D = 180 - (2i + 2a) \dots 2$$

giving a change of deviation equal to twice the angle turned by the mirror. As an example, if the mirror turns through an angle of 10° , the incident direction being constant, the change of deviation will be 20° .

If we take two reflecting surfaces at an angle with each other but both perpendicular to the same plane, we find that the deviation is independent of the incident angle. Let ABC, CDE be two mirrors, fig. 10 the angle between them being θ , and let $HBDI$ be the path of incident light before and after reflection; then the total deviation is the sum of the deviations at the two surfaces.

The deviation at the first surface is

$$180 - 2i_1$$

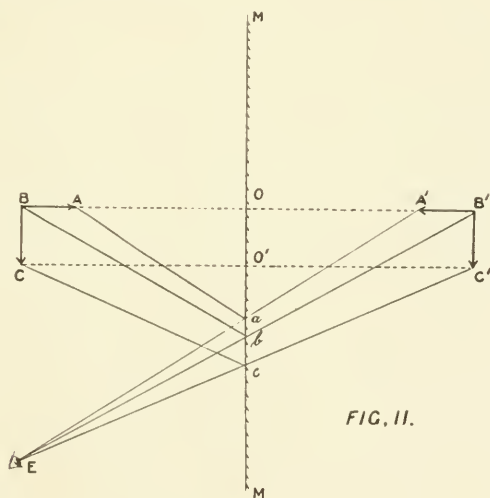
that at the second

$$180 - 2i_2$$

so that the total deviation is

$$360 - 2(i_1 + i_2)$$

but the exterior angle θ between the normals BG and DF is equal to the contained angle θ between the mirrors.



Further it can easily be proved that

$$i_1 + i_2 = \theta$$

The total deviation

$$360 - 2(i_1 + i_2)$$

becomes therefore

$$D = 360 - 2\theta \dots \dots \dots 3.$$

The angle E however equals $180 - \theta$, so that equation 3 may be written

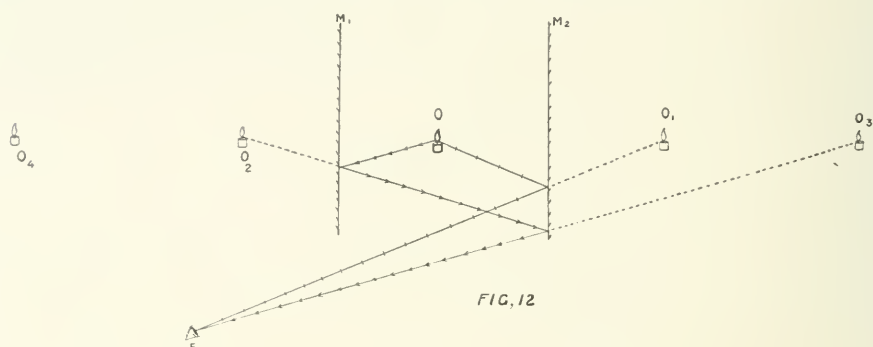
$$D = 2E \dots \dots \dots 4.$$

where E is the external angle between the mirrors. Since the angle of incidence does not appear in the equation it follows that the deviation depends only upon the angle between the mirrors.

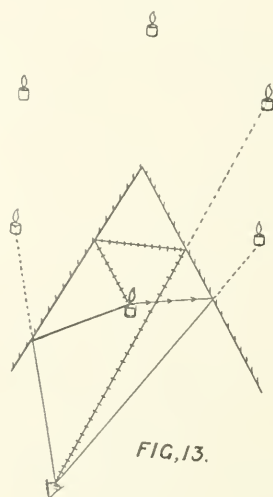
To find by graphic means the position of an image formed by a plane mirror we make use of our first law of reflection.

In fig. 11 let MM be a plane mirror and ABC an object. To construct the image set off OA' equal to OA , OB' equal to OB , and OC' equal to

O C, then $A' B' C'$ is the image. To trace the path of the light to an eye E in any position in front of the mirror draw straight lines A E, B E and C E from points on the image to the eye, then straight lines A'' , B'' , C'' , from corresponding points on the object to the intersection points of the lines E, A' , etc., with the mirror. It should be noted that $A' B'$ is inverted with respect to A B, while $B' C'$ is erect. Hence we see that only that part of an object in a plane at right angles with the mirror has its image inverted.



When an object is placed between two mirrors more than one image is formed since the image formed by one mirror becomes the object for the other. In fig. 12 the two mirrors $M_1 M_2$ are parallel, and O is an object between. Then O_1 is the image of O formed by M_2 , O_2 is the image of O formed by M_1 , O_3 is the image of O_2 formed by M_2 , while O_4 is the image of O_1 formed by M_1 . This process would continue *ad infinitum* if there were no loss by absorption, etc. As it is, we have a considerable succession of images when the mirrors are parallel. Fig. 12 also shows the path of the



light from two of the images to the eye E. If however the mirrors are inclined so that the angle between them is an aliquot part of 360° the images will be limited in number and will form a symmetrical pattern (fig. 13). The

number of objects apparently seen (or the number of sides to the pattern) will be

$$\frac{360}{A}$$

where A is the angle between the mirrors. Fig. 13 shows the path of the light from three images to the eye. In both fig. 12 and fig. 13 the positions of the images are determined by our first law of reflection.

The surface of a perfect plane mirror will not be visible since it alters the direction of the whole of any beam of light falling upon it, but if the surface be irregular the light from different parts of the object will be deviated different amounts thus producing distortion, while if the surface be quite plane but badly polished or scratched, scattering at the surface will take place and the scattered light will tend to obscure the image. For these reasons when plane mirrors are to be used for accurate work they should be as perfect as possible.

INHERITED SYPHILIS AND BLUE SCLEROTICS.*

BY

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A MALE infant, aged 5 months, an only child, was admitted to the Grove Hospital for nasal diphtheria on November 15th, 1910. The father had contracted syphilis about six years previously, and had undergone only a few months' treatment. Six months after marriage and one year before the baby's birth the mother developed "a poisoned lip," probably a hard chancre, of which the scar is still visible in the centre of the lower lip. Its real nature does not seem to have been recognised, as she received only local treatment on seeking advice at a hospital.

When three weeks old, the baby lost all power in his left arm, but recovered the use of the limb in the course of a month without specific treatment, and when six weeks old, had "thrush at both ends," which was probably mucous tubercles in the mouth and round the anus.

Condition on Admission.

Atrophic, fair-haired infant, weight 8 lb. 7 oz., constantly crying. Marked prominence of scalp veins, bulging forehead, umbilical and right inguinal hernia. Crusts in right nostril, from which diphtheria bacilli were cultivated. No eruption. Spleen and liver not enlarged. Heart normal.

Both sclerotics show a uniform pale-blue coloration; irides grey; embryontoxon at the margin of each cornea.

During the child's stay in hospital the blue coloration of the sclerotics was more obvious on some days than on others.

The mother, aged 27 years, a woman of fair complexion, presented an almost identical condition of the sclerotics, but the coloration was somewhat deeper, more nearly approaching a leaden hue. An arcus senilis was present in each eye. Beyond occasional smarting on exposure to wind and lacrymation following prolonged accommodation, her eyes had not caused her any

*Case shown at the Royal Society of Medicine (Section for the Study of Disease in Children) on March the 24th, 1911.

trouble. She stated that her sister, a fair-haired girl, aged 16 years, presented the same condition, as did also their grandmother, now dead. Their two brothers, aged 37 and 22 years respectively, were not affected.

Treatment and Progress.

The child's nasal diphtheria cleared up under 4000 units of antitoxin, but diphtheria bacilli persisted in the nose until February, 1911. Four days after admission, periostitis of the upper end of the left ulna developed, but subsided in a few days after administration of mercury with chalk, gr. $\frac{1}{2}$ twice a day. Beyond some erosions round the anus and paronychia of the right ring-finger, nothing further of note occurred until January the 12th, 1911, when the left arm was found to present the flail-like attitude characteristic of Parrot's syphilitic pseudo-paralysis. On palpation, the arm was found to be excessively tender, and definite crepitus was felt at the junction of the upper and middle third of the humerus. The temperature was 101° F. for two days, and then became normal.

The limb was put up for a fortnight in a cardboard splint, and the mercury, which two days before the fracture had been reduced to gr. $\frac{1}{4}$ twice a day owing to loose stools, was increased on January the 21st to gr. $\frac{1}{2}$ twice a day and on February the 4th to gr. $\frac{1}{2}$ three times a day. On January the 28th, when the splint was removed, there was good union, and well-marked callus was felt. Active and passive movements were free. Subsequent recovery was uneventful, and the child was discharged in good health on March the 9th, 1911.

Remarks.

The principal features of interest in the case are the extra-genital infection of the mother, the spontaneous fracture of the humerus in the child, and the condition of blue sclerotics in three generations. Although no Wassermann's reaction was performed, the history of the case and the position of the scar made it practically certain that the lesion on the lip had been a chancre.

Spontaneous fractures, or, to use Broca's more accurate term, "pathological fractures," are comparatively uncommon in syphilis, especially fractures of the shaft as distinct from separation of the epiphyses, and still more exceptional is it for the fracture to be limited to a single bone instead of the lesions being multiple, as in most of the recorded cases. This was probably due to the adoption of specific treatment, as shortly after admission, before mercury had been given, the child developed periostitis of the ulna, thus indicating that the osseous system showed a special tendency to be involved.

The symptom of persistent crying, to which attention has recently been drawn by Comby and Sisto as a phenomenon of inherited syphilis, was probably due to pains in the bones.

The occurrence of the fracture during mercurial treatment was probably due to the doses being too small, as rapid recovery ensued on increase of the dose.

The case is illustrative of the favourable course of pathological fractures in inherited syphilis, provided suitable treatment be adopted. All authorities now hold this view, but Parrot, who first described syphilitic pseudo-paralysis, regarded it as a very unfavourable sign, as all his cases died.

If the history could be trusted, the same arm had already been affected when the child was three weeks old, and recovery had taken place without specific treatment. A similar case of spontaneous recovery from syphilitic pseudo-paralysis has been recorded by Cadet de Gassicourt, and Gouez has collected five other cases in which improvement occurred before mercury was administered.

It should be noted that the humerus is the most frequent site of pathological

fracture in syphilis, as it was affected in twenty-two out of sixty-four such cases collected by Frangenheim.

The condition of blue sclerotics as a congenital disease was first described by von Ammon in 1841 in the following terms: "Congenital diseases of the sclerotic are rare. . . . Of importance is a peculiar whitish-blue coloration of this membrane occasionally met with, when the whole development of the eye is retarded. The sclerotic in such cases appears thin and almost transparent. I have seen it also in congenital hydrophthalmos. . . . Similar thinness occurs in patients suffering from congenital heart disease. In that case the sclerotic is dark blue, this being due partly to the thin condition of the membrane and partly to an accumulation of venous blood and a large mass of pigment in the eye." Von Ammon's description is accompanied by two illustrations (Tab. XV, figs. 2 and 3), the first representing the blue coloration in a case of congenital hydrophthalmos and the second in a case of congenital morbus cordis.

After von Ammon, little notice seems to have been taken of the anomaly until 1903, when Leslie Buchanan, of Glasgow, described a case in a girl, aged 9 years, whose left eye he examined after excision for an injury. He found that the cornea and sclerotic were unusually thin, the cornea being three-fifths and the sclerotic one-third of its normal thickness. Histological examination showed that the fibres of the cornea and sclerotic were of about normal size but unusually few in number. Bowman's membrane was entirely absent.

In a paper entitled "A Congenital Anomaly of the Sclera: Pseudo-coloboma," to which Sydney Stephenson has kindly drawn my attention, Percival J. Hay, of Sheffield, in 1907, described a condition resembling that under discussion, but differing from it in that the thinning of the sclerotics, instead of being uniform and symmetrical, was in the right eye represented by a triangular area on either side of the cornea, and on the left confined to an area on the temporal side only. The case occurred in a still-born child, the subject of many other congenital deformities. There was no family history.

It was not till 1908 that the hereditary transmission of blue sclerotics was first mentioned. In that year A. Peters of Rostock, recorded cases in four generations. Four of his patients showed a typical embryontoxon. Peters regarded the condition as due to an abnormally thin or abnormally transparent sclerotic.

In 1910 Sydney Stephenson described the condition affecting twenty-one out of thirty-two members belonging to four generations of one family. In his cases, as in mine, the inheritance was through the females, and the complexión, in general, was fair. In two cases the presence of an arcus senilis or an embryontoxon was noted. Subsequent investigation enabled Bishop Harman to add another generation to this family, so that a total of fifty-five members was reached, of whom thirty-one showed the same congenital peculiarity with individual differences.

It did not occur to me that there was any connection between the pathological fracture of the child's humerus and its blue sclerotics until, while looking up the literature on Abnormalities of the Sclerotic in the Surgeon-General's Index Catalogue, I came across a paper by Alfred Eddowes, entitled "Dark Sclerotics and Fragilitas Ossium," where he described some cases running in families in which the two conditions were associated. Eddowes suggested that the transparency of the sclerotics indicated a want of quantity or quality in the fibrous tissue forming the framework of the various organs of the body, which therefore accounted for the want of spring and toughness in the bones. Eddowes has kindly informed me that he never even suspected inherited syphilis in his cases.

Possibly, the deficiency of fibrous tissue in the present case, as manifested by the blue coloration of the sclerotics, may have been a contributing factor, together with syphilis, in the production of the fracture. There was, however, no history of fragilitas ossium in any other member of the family.

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CLINICAL MEMORANDA.

ON THE MANAGEMENT OF PRESBYOPIA IN CERTAIN CLASSES OF WORKMEN.

BY

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WHEN not to prescribe glasses is a subject which is not often referred to. Yet the matter is of importance,

In the course of experience among the working classes of a busy industrial district it has been borne in upon me that the worst advice that can be given to certain workmen is that they should wear glasses before it is necessary.

We all know, as a matter of experience, that one of the commonest remarks made by presbyopic patients is, that having taken to glasses, they are unable to give them up again. And such is, indeed, the truth.

When a man in the prime of life, earning high wages, comes to us with the complaint that he no longer sees quite so well at night, when reading his paper, as he formerly did, and when that man is found to be just presbyopic, perhaps at a rather early age owing to some slight hypermetropic error, are we doing the best possible for him if we order him to wear glasses for reading at night?

The answer obviously hinges upon the patient's occupation.

If the work is such that the employer commonly permits the wearing of glasses at work, then, of course, the answer is in the affirmative.

If, on the other hand, the work is of a nature which either of itself or through the prejudice of the employer, individually or as a class, precludes the use of glasses during working hours, the answer is not so easy.

Take the case of a mechanic working with a rule. He makes the usual complaint that he does not see to read his newspaper at night so well as

formerly. You ask him, has he any difficulty with his work, any difficulty in reading his rule? Often enough, the answer is that under ordinary circumstances there is none. Perhaps if the light is bad it may not be easy, although still quite possible, to read his rule. Is it right to correct that man's presbyopia, knowing that he cannot wear glasses when at work?

There is no need to labour the point by referring to this or that kind of work. The fact remains that in certain classes of employment, glasses are not permitted or permissible. In workmen of the skilled class, who are becoming presbyopic, it is necessary to consider whether it is wise to encourage the ciliary muscle to depend upon the assistance of a glass during one period of the twenty-four hours, while obliging it to work during another period without any such assistance.

In my own practice among this class of presbyope I am in the habit of making careful enquiry into the facts of each case before ordering glasses. My general rule is that if a patient can still do his *work* unaided, although finding difficulty at home in the evening, I encourage him to do without glasses in the meantime. He can curtail his reading.

This is not the place to discuss the various "dodges" which a cunning workman may employ, in order to use glasses without being observed. In any case, as a mechanic said to me only the other day, these dodges are always discovered sooner or later.

Then there is another point which, although it does not come strictly within the title of this note, is perhaps worth referring to. What should be our advice to those not actually presbyopic, and not actually at present embarrassed, who must of necessity from the nature and degree of their refraction error suffer from visual difficulty at a comparatively early age? This class is naturally divisible into two — namely, those who have not adopted, or who have only very recently adopted, their calling in life, and those who are already so far advanced and experienced that a change of occupation is a very serious matter.

With regard to the first of these classes, I think it is one's duty to warn the patient, or, more usually, his friends, that he has a refraction error which may eventually interfere with his wage earning capacity if he goes into certain employments. Such advice is gratefully accepted, and often acted upon.

As to the second class, one is less hopeful of being of service. Many times have I given the advice to a young adult to change his occupation if he should get the chance, before it was too late; but the advice has, I am sure, seldom been taken. These people, making good wages at present, will not readily believe that their vision for near work, in some cases even for distance, may give way before they are middle-aged, and that they may have to seek a change of employment, at a time, probably, when they have incurred responsibilities such as were not in question at the earlier age.

CLINICAL STUDY OF THE OPHTHALMIC CONDITIONS SEEN IN A CASE OF UNIVERSAL CONGENITAL ATRICHIA.*

BY

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THROUGH the kindness of Dr. Augustus A. Eshner, one of the writer's colleagues upon the visiting staff of the Philadelphia General Hospital, the writer has had opportunity to study critically the ocular signs and symptoms in a case of universal congenital atrichia.†

The patient was a sixty-four year old man, whose occupation was that of a house painter. He came to the hospital "complaining of pain throughout the body, especially in the lumbo-sacral region." Dr. Eshner's records of the case showed that "he presented slight swelling of both lower extremities and drooping of the right upper eyelid, with inability to elevate the lid properly. The action of his heart was arrhythmic, but the sounds were clear. The especially noteworthy feature about the patient," (Dr. Eshner states) "was the total absence of hair from all parts of the body, a condition that, according to the patient's repeated statement, had existed from birth. The skin itself was soft, smooth, and unctuous. The man related, further, that he perspired but little. The nails of the fingers and toes were only about one-half the normal length, and their distal extremities were irregular and longitudinally rugous. The patient stated that they had presented this appearance from birth and that he never trimmed them. He had only three teeth in the lower jaw and none in the upper; the others had gradually fallen out in the progress of time. The urine was free from albumin and sugar."‡

Careful ophthalmic study of the case showed a complete absence of the eyebrows and eyelashes. The ciliary borders of the eyelids were regular in outline, thin, and apparently free from any glandular involvement. The conjunctivæ and carunculæ were normal in every respect, except that they were pearly in tint and were devoid of any areas of thickening. The pupils, which were round, equalled two and a half millimeters in their horizontal diameter. Corrected far and near visions for low degrees of farsightedness, astigmatism, and presbyopia, were proper for age, and degrees and kinds of refraction error. Color-perception was normal in every respect, except that there was a slight lessening of color-saturation. The fields of vision were somewhat diminished in size, although they presented their correct relationships and gave their ordinary relative orders. Light sense, carefully estimated, seemed but little disturbed. Exterior ocular muscle action and condition, with the exception of a slight paresis of the right levator palpebræ, were good. The irides, which were gray, were equally and properly tinted: their muscles

*See *Philadelphia General Hospital Reports* for 1911.

†*Ide American Journal of the Medical Sciences* for April, 1905, for Dr. Eshner's most interesting account of the general appearances of the case.

‡In his account of the case, Dr. Eshner properly adds the following statement "Whether the absence of hair in this case had really existed from birth, as the patient maintained, cannot, of course, be established with certainty, as we have only his unconfirmed statement to this effect." He says, however, that "in any event, the condition, whether one of generalized loss of hair or one of generalized failure on the part of the hair to develop, is exceedingly rare. I have been able to find records of only a few similar cases, and to some of these the references are exceedingly brief, and in some instances indefinite."

were actively and freely mobile to light stimulus and accommodation and convergence impulses. No coarse sensory changes of the eyeballs and their adnexa were obtainable.

The media were clear. There was a well pronounced binocular condition of about equal degrees of the imperfectly termed 'retinitis albescens,' best simulating the punctate variety so well described by Mooren. Nyctalopic symptoms were not complained of.

Microscopic study failed to show any evidences of oxaluria.

NYSTAGMUS ON CLOSING EYE.

BY

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Miss A. R——, age 20 years, comes complaining of headaches for two years. Wears +1. D. spheres. It has been observed only during these two years that the eyes move when they are closed.

On examination, one noted that as soon as the eyes were shut, they make lateral movements, 85 to 100 double movements to the minute. This ceases during sleep; and she can by an effort hold the eyes still for a minute or less, during which effort, however, the lids continually quiver. When she looks up with the eyes open, there is a little tendency to a similar nystagmus, but it is inconstant. She has always been nervous and "jumpy," has a floating kidney, and had rheumatic joints when 12 years old.

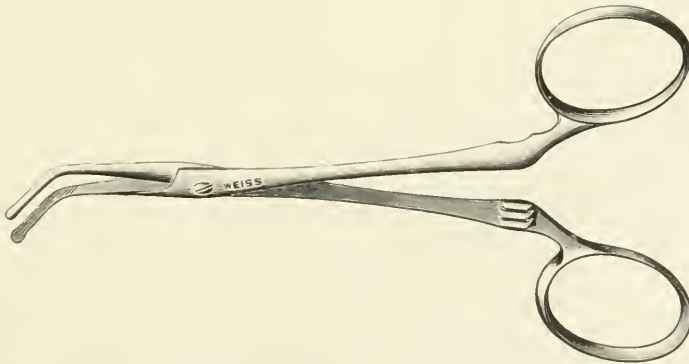
Under homatropine and cocain: $\left\{ \begin{array}{l} R.V. = \frac{6}{12} - 1.0D. \text{ cyl. axis } 120^\circ \\ L.V. = \frac{6}{9} - 0.75D. \text{ cyl. axis } 120^\circ \end{array} \right. \begin{array}{l} \angle = \frac{6}{5} \\ \angle = \frac{6}{5} \end{array}$

Latent deviation 3° ; vertical 0° .

NOVELTIES.

NEW ADVANCEMENT FORCEPS FOR SQUINT.

The accompanying figure depicts a forceps made for me by Messrs. Weiss & Son, of 287, Oxford Street, W., for fixing the muscle in squint operations where advancement is needed



The same forceps can be used with equal facility for right or left eye, and is quickly adjusted.

It has a three grade pressure catch which is advantageous in that the thickness of tissue enclosed between the blades of the forceps is not the same in all cases.

It will be found that the finger rings of the forceps make it easy to hold or to transfer from hand to hand, and simple for an assistant to retain without obstructing the view of the surgeon.

W. H. JEWELL.

27, New Cavendish Street.
London, W.

REVIEW.

CONICAL CORNEA.

BY

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IN May, 1909, a discussion, opened by Professor Parisotti, of Rome, took place at the French Ophthalmological Society on that curious disease Conical Cornea (Keratoconus).

In the following Review an attempt will be made to give prominence to certain of the points brought out by the discussion, as well as to glance at some other communications dealing with the disease.

Frequency.

True conical cornea must be regarded as a rare disease, although, as pointed out by Sulzer, a certain number of supposedly normal corneæ, when examined with the ophthalmometer, present peculiarities of curvature analogous with those of keratoconus. Javal described these cases under the name of *cornées décentrées*. They may be regarded as instances of abortive keratoconus, and manifest themselves by astigmatism, by visual acuity somewhat below normal after correction of the error of refraction, and often by persistent asthenopia. Among twenty-two supposedly normal corneæ, Sulzer found four to present evidences of discrete keratoconus. Rochon-Duvigneaud, also, takes the view that slight degrees of keratoconus are not uncommon, and are apt to be overlooked in the absence of examination by the keratoscope.

From this point of view, then, classic keratoconus represents the extreme and rare evolution of a commoner corneal defect, which produces the same symptoms and is characterised by the same anomaly of curvature as the more serious disorder. Examined with Placido's disc, the images reflected from the cornea present the same deformities of the concentric circles as is produced by keratoconus, although to a less degree.

When we come to actual figures, we find some notable differences in those given by different authorities, although from that it would perhaps scarcely be safe to conclude that there exist geographical differences in the frequency of the disease. Thus, Holt¹, of Christiania, saw no instance of conical cornea among 35,000 patients, and Péchin¹, of Paris, had the same experience among 10,000 patients, while Komde¹, of Tokio, among a similar number, met with scarcely a single instance of keratoconus. Axenfeld¹, of Freiburg, had one case among 25,000 patients. Parisotti¹, of Rome, and Antonelli¹, of Paris,

each met with a single case in 10,000 patients. On the other hand, Vacher¹, of Orleans, had one case in 2,500 patients, Park Lewis², of Buffalo, one in 1,205, and Bullard³, of Nebraska, about one in 1,000. Again, during the years 1894 and 1895 a total of 26,470 patients were seen at the Wills' Eye Hospital, Philadelphia,² and among that number there were 40 cases of conical cornea. White Cooper³ is stated to have seen 194 cases of keratoconus in 209,000 patients.

We may conclude, then, with Parisotti, that keratoconus, regarded as a morbid entity, is in reality rare.

Sex and Age.

The conviction, common among ophthalmic surgeons and current in text-books, that conical cornea is more frequent in females than in males, does not appear to be generally admitted by the most recent writers. Indeed, Scalinci¹ has found from an examination of the figures, that the disease is more frequent in men than in women.

It is agreed that conical cornea is essentially an affection of early adult life. The usual limits are placed at from 15 to 30 years. The only juvenile case mentioned by Parisotti was one reported by James Wardrop¹. At the same time G. Guiot⁵ (1887) incidently mentioned a case in a girl of twelve years, in whom symptoms had commenced three years before. Axenfeld⁶, again, exhibited to the Marburg Medical Society in 1896, a patient of thirteen years with keratoconus, in whom the disease was said to have existed since the first year. For that matter, by Robert Sattler⁷ and others, the affection has been regarded as a congenital deformity. Indeed, in 1831 A. von Ammon⁸ reported a case of keratoconus, associated with a deformity of the skull, in a man of 21 years, and expressed his belief that the condition was congenital.

Some Symptoms.

Axenfeld⁹ has drawn attention to the occasional existence in keratoconus of minute clefts in Descemet's membrane, visible more especially when the parts are examined with the Zeiss corneal microscope. These clefts appear as double-contoured lines, looking something like spun glass. They have been found in several other conditions which have distension of the eye-ball in common, such as megalocornea, buphthalmos, high myopia, and intra-ocular tumours with increased tension.

By F. Park Lewis¹⁰ renewed attention has been directed to pulsations of the cornea occurring synchronously with each impulse of the heart and pulse. This curious symptom was earlier described by Javal, Gullstrand, Wagenmann, Leroy, and Dubois.

The pulsations are to be appreciated only by examining the corneal images with Placido's disc, the ophthalmometer, or similar appliances. The patient may himself be aware of the symptom, which is observed only when the cone is very thin. Lewis has made the interesting suggestion that, were it possible to detect it, a small pulsation of the cornea might be found to be a normal phenomenon in the human eye, and that this becomes apparent when the tenuity of the cornea is reduced, as in keratoconus.

Diagnosis.

In a recent law case (Markham *v.* Abrahams*), where a young lady successfully sued an optician because he had overlooked conical cornea at

* See p. 352 of the present issue of THE OPHTHALMOSCOPE.

an early stage, much turned upon the question of the diagnosis of the condition. When all is said and done, it must be admitted that the recognition of keratoconus at a very early stage is not always a simple matter, even for the ophthalmic surgeon. In 1864 F. C. Donders¹¹ speaking of conical cornea, said: "High degrees strike the eye at once. Slight degrees, on the contrary, are often enough overlooked. . . . Three cases have already occurred to me which were long treated as amblyopia." "When this affection is but slight," wrote J. Soelberg Wells¹², "a cursory observer may easily overlook it, and mistake it, perhaps, for a case of myopia, complicated with weakness of sight (amblyopia)."

A case described by Morax¹³ is of particular interest in this connection. Morax was consulted by a patient in whom a first examination revealed only a regular inverse astigmatism, susceptible of optical correction with normal visual acuity. Morax regarded the case as one of simple astigmatia. Examinations made during the following years, however, convinced him that he had originally been dealing with an incipient conical cornea. The astigmatia had increased notably, and had lost (at least partially) its regular character. A somewhat similar case was reported by Kopff¹⁴ (see p. 337).

As regards the early diagnosis of conical cornea, two useful, though possibly obvious, lessons were emphasised by the Markham & Abrahams case: (1) that whenever apparent myopia is increasing in a young person, and cannot be corrected by glasses, the cornea should be carefully examined for conicity; (2) that an increasing amount of astigmatism is very suggestive of the disease.

There is an early stage of keratoconus where the disease can be detected only by the investigation of the catoptric images of the cornea, for which purpose an ophthalmometer or some similar appliance is essential. Later, of course, the intelligent use of the ophthalmoscope, as pointed out long since by Sir William Bowman,¹⁵ is adequate. But the characteristic play of the retinoscopic shadows would be difficult for an optician to detect, more particularly as he would naturally be working with eyes, the pupils of which were not dilated by artificial means.

Course and Progress.

Keratoconus is essentially a self-limited disease. It may come to a standstill at any age, even in the absence of all treatment. To quote the words of Rochon-Duvigneaud¹: "In most cases that I have seen, the affection has appeared to me often to reach in several months or in two or three years a degree which it scarcely exceeds and which is different for each patient. I do not therefore believe that the disease is indefinitely progressive, as it were, and that, consequently, the resources of surgery must be summoned to prevent progression." Truc¹ quoted the case of a senator in whom keratoconus had remained stationary for twenty years. G. A. Berry¹⁶ says:—"There is a decided tendency for the condition to remain stationary after having progressed for some time." "I have seen several cases," he continues, "where the condition has lasted for upwards of thirty years without destroying sight, or indeed rendering reading altogether impossible."

That uncomplicated conical cornea does not lead to actual blindness appears to be generally admitted, although it may, of course, compromise sight very seriously. The power of orientation appears to be retained even in advanced cases, so that the patient can get about alone. Sir William Lawrence¹⁷ mentions the case of an old clergyman who was the subject of this affection for nearly thirty years, and yet who was enabled to continue his duty in the pulpit with tolerable accuracy to the time of his death, which happened when

he was about seventy. The apex of the cone had become opaque in this case. A. Terson¹ knew of a bicyclist who, even without the aid of glasses, was able to guide himself without accident through the crowded streets of Paris, although he was incapable of reading anything.

In the Markham *v.* Abrahams case it was alleged by the medical witnesses for the plaintiff that an increase in conicity as represented by 4 D. of astigmatism could not have taken place in the course of about seven months. One expert witness expressed the opinion that such an increase would certainly be accompanied, supposing it to occur, by cloudiness of the cornea. The inference drawn was that the glasses prescribed by the defendant were too weak, since they included 4 D. less astigmatism than was declared to be present seven months later by an ophthalmic surgeon.

But literature contains records of several cases, such as those of H. Steinheim, von Arlt, and others, where a more or less sudden increase in conicity occurred, accompanied or not by opacity of the cornea. Indeed, that such an event was possible was recognised by Benjamin Travers¹⁸ as long ago as 1824. "The disease," wrote Travers, "is sometimes slow, occupying months, and even years; and, on the contrary, I have seen it produced in its greatest extent in the short space of eight weeks."

Steinheim¹⁹ found in the case of a young man, whose sight had been failing for six weeks only, that there was a very considerable reduction in vision, and that the development of the cone had distinctly commenced, as the side view and experiments on reflection plainly showed. It is expressly stated that in this patient the apex of the cone was free from opacity. von Arlt²⁰ relates a case where keratoconus of the left eye (V. = No. 2) had existed for nineteen weeks. In the course of four weeks, the vision of the other eye had failed so much that it was equal only to No. 2 Jaeger at 4 inches. No mention whatever is made of opacity in this case.*

The opacity, as we know both by clinical and experimental evidence, may last for a short time only, and hence might readily escape detection in the interval between two successive examinations, especially if separated by a few weeks.

The attenuated cornea would appear likely to rupture spontaneously. Yet, according to Parisotti¹, such an accident has been known to occur once only. The case in question was reported by William Mackenzie²¹ (1854).—A young lady, the subject of conical cornea, suddenly, on stooping, felt as if her eye was giving way, and immediately the cornea was observed to present a milky appearance. This was gradually removed, and eventually the form of the cornea became nearly natural. It is not altogether clear from Mackenzie's account that the cornea did actually rupture in this case. A more likely event would be a tear in Descemet's membrane.

The slow course of keratoconus towards a given point, which differs for each patient, may nevertheless be interrupted by exacerbations, and these may be accompanied by deep-seated cloudiness or even circumscribed bulging of the corneal tissue.

A case of the first kind was reported in 1875 by W. A. Brailey²² in a man, aged 24 years, who suffered from a slight degree of keratoconus in his right eye (V. = 20/100 and No. 1 Jaeger), the left being more severely affected (V. = No. 16 Jaeger at 1 inch.) An opacity of the right cornea, which invaded the

* A few years ago the reviewer came across the following case.—A lady, aged 24 years, suffering from bilateral keratoconus. The sight was brought up to R.V. 6/18 and L.V. 6/24 with R.E. +1.0 D. sph. and -3.0 D. cyl. and L.E. +1.0 D. sph. and -3.0 D. cyl. Sixteen days later, L.V. had gone down to a doubtful 6/60 and the eye required the following correction before vision reached its former point (6/24): +1.0 D. sph. and -5.0 D. cyl.

whole corneal zone, supervened suddenly without known cause, so that he could read only No. 19 Jaeger at two inches with the eye. A morsel, removed from the cone with the trephine, when examined microscopically, showed a large gap between the superficial and the deeper layers of the anterior epithelium. Plaut²³, again, had a case in a man, aged 32 years, affected with typical keratoconus in both eyes, who, without known cause, suddenly, on awakening one morning, found the sight of one eye had become much worse, a condition accompanied by symptoms of violent irritation. The surface of the affected cornea was stippled, while its parenchyma was very grey and opaque. On removing the apex of the cone, the cornea was found to be three times thicker than normal, presumably from œdema.

Terrien's case²⁴, although it presented a different clinical appearance, evidently belonged to the same category. It occurred in a woman of 38 years suffering from bilateral keratoconus, much more pronounced in the left ($V. = 1/40$) than in the right eye ($V. = 1/4$). After the condition had lasted for some five years, the woman almost completely lost the sight of her right eye during the course of a single night. The region formerly occupied by the cone was found, on examination, to be now occupied by a circumscribed opalescent ectasia, of globular form. A median tarsorrhaphy was performed, and the corneal staphyloma (for that is what it amounted to) diminished little by little, and had disappeared completely in the course of six weeks. Terrien explained his case on the view that the membrane of Descemet had ruptured at the level of the summit of the cone, thereby allowing aqueous to penetrate between the lamellæ and to produce œdema of the cornea and the peculiar ectasia.

The cases of acute keratoconus reported by Pflüger²⁵ (1877) and by Rabinowitsch²⁶ (1908) respectively, are analogous with the foregoing. Pflüger's patient was a girl of fourteen years, who noticed a pricking of her left eye, and very speedily remarked that the cornea had become cloudy. A couple of days later, the cornea was conical to such a degree that the protrusion measured more than 7mm. from base to summit, and could not be covered by the closed eyelids. The most prominent part of the cone showed striæ. Inflammatory phenomena were present. The intra-ocular tension was lowered. In Rabinowitsch's patient, a girl of fourteen years, keratoconus with corneal opacity developed in the course of one night.

Burgman's²⁷ very remarkable case, where the cornea of both eyes of a person who was hanged, were so prodigiously extended that they reached down to the mouth, like two horns, is probably to be explained by rupture of Descemet's membrane engrafted upon a pre-existing keratoconus.

Finally, it is important to remember that keratoconus may undergo spontaneous cure, as in Coppez's case, where in a father and a son the corneal deformity disappeared, without any treatment whatever, at about the age of fifty. Sanson²⁸ has related a case in which spontaneous cure took place after the affection had existed for several years. Rohmer¹ saw keratoconus disappear from one eye after the cautery had been applied to the other similarly affected.

Morbid Anatomy.

Once it was believed that the conical protrusion was solid, but in 1819 Wardrop pointed out that its apex was usually very thin. Jaeger (1830) on dissecting the eyes of a person with conical cornea, discovered that the apex of the cone was extremely thin, while the circumferential portion of the cornea, on the contrary, was thickened.

Most writers now maintain that the thinning is limited to the ectatic part of the cornea, although by some it is stated that the cornea is thinner than normal even as regards the non-ectatic part.

Parisotti¹ comments upon the scanty number of communications dealing with the minute pathological anatomy of keratoconus. The reasons, however, are obvious. Most of the examinations on record have been made on particles of tissue removed by surgical operation for relief of the condition.

From these (and other) examinations it appears that the anterior epithelium may show vacuoles (Brailley²²), or interruptions (Salzmann²⁰), or foldings (Uthoff³⁰), or thickenings (Lawson³¹, Newolina³²).

Bowman's membrane may be lacking or almost lacking in places (Alt³³, Uthoff, Newolina³²), or may include fine vessels (Fleischer³⁴).

As regards the ectatic part of the corneal stroma, it may show fibrillation (Hulke³⁵, Uthoff), or an irregular stratification of the corneal corpuscles, more especially in its anterior layers (Fleischer³⁴).

More interest attaches to the condition of Descemet's membrane, to which considerable attention has recently been paid. Erdmann³⁶ noted a considerable thickening of the membrane, not only at the periphery but also at the centre. Uthoff³⁷ found the membrane to be intact in a recent keratoconus, while in the second eye of the same patient, where the condition was more advanced, he discovered an interruption in the continuity of the structure. This he believed to have come about after the formation of the keratoconus. Salzmann²⁰, also discovered an interruption in the continuity of Descemet's membrane, but regarded it as secondary.

As to the opacity not seldom observed at the summit of the cone in advanced cases of keratoconus, there have been various explanations—as, for example, malnutrition, friction by the eyelids, ulceration, exposure of the cone to the air during sleep, condensation of tissue, and so forth. Parisotti¹ believes that the best explanation so far suggested is that of an interstitial œdema. Newolina³² however, found the opacities to be caused by epithelial hyperplasia and by processes of connective tissue growing through deficiencies in Bowman's membrane.

Pathogeny and Ætiology.

Parisotti¹ adopts the view that keratoconus depends essentially upon a lack of resistance in the central parts of the cornea, rendering the last-named incapable of sustaining even the normal intra-ocular pressure, and that the defect is of congenital origin. This was the theory endorsed by von Graefe³⁸ in 1868. It was also taken by Sir John Tweedy³⁹ in a communication made in 1892 before the Ophthalmological Society of the United Kingdom. Tweedy's hypothesis was that the "constant physical factor in conical cornea is an imperfect embryological development and growth of the centre of the cornea," which he traced to failure of the apices of the intruding processes of meso-blast to meet and to coalesce, as they should do, at the centre of the cornea. In this way that part of the cornea formed, as it were, a weak spot, destined later to yield to the strain of accommodation. This view is supported by the several facts that keratoconus not infrequently affects more than one member of a family;* that it may be associated with other congenital

* In Panas's remarkable case, a grandmother and her three children and their children were affected with congenital cataract, and the only child exempt from cataract developed bilateral keratoconus at puberty. In the discussion at the French Ophthalmological Society de Lapersonne mentioned a family in which three generations were affected with keratoconus and congenital cataract, sometimes isolated and at other times associated in the same subject. In the same discussion Louis Vacher mentioned the case of a mother and daughter affected with bilateral conical cornea.

deformities; and, lastly, that the protrusion practically always occurs in one definite part of the cornea.

Scalinci⁴⁰ denies that the embryological development of the cornea progresses, as assumed by Tweedy (who apparently depends upon an illustration from Balfour's *Comparative Embryology* to prove his point) from the periphery towards the centre. Péchin¹ likewise challenges the accuracy of Tweedy's views upon the development of the cornea. At the same time the centripetal development of the cornea is the view still generally accepted.

Tweedy's theory supposes that the central defect involves the stromal elements of the cornea. The deficiency, however, may conceivably fall upon other elements.

The existence of elastic fibres in the cornea has now been rendered certain by the impregnations of Lieto Vollaro and Monesi. By Scalinci³⁸ it has been suggested that these elastic fibres may be involved by the congenital lesions believed to be responsible for keratoconus. Parisotti¹, too, adopts this view, and he suggests that particular attention should be paid to the condition of the elastic elements of the cornea in future histological investigations of cases of keratoconus.

Parisotti¹ tried to determine, by experiment, the rôle, if any, played in the causation of conical cornea by a nutritional disturbance of the central parts of the cornea. For this purpose he employed electrolysis. With the point of an extremely fine needle, connected with the negative or the positive pole, as the case might be, he made a series of fine punctures through the cornea, so as to include a central area, of 3 mm. to 4 mm. in diameter. As shown by figure 1,

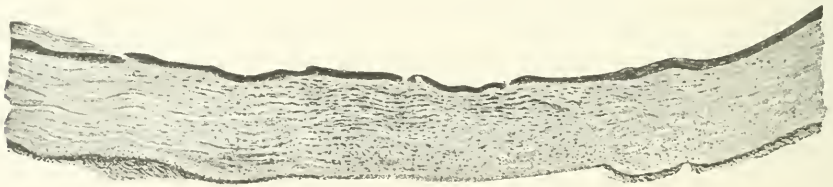


Figure 1.

no elevation, conical or otherwise, was produced, although skiascopy brought out the fact that the central parts of the cornea, which retained their transparency, were myopic to the extent of 7 D., which is very high for the eye of a rabbit.

That the inherent weakness, assumed to be the predisposing cause of conical cornea, may involve Descemet's membrane has also been suggested, and an important case by Peters⁴¹ shows that the structure in question may indeed present congenital deficiencies.—A child was born with embryontoxon and a central opacity of the cornea. Microscopically, the deeper layers of the cornea, not less than Descemet's membrane, were absent from the centre, where the corneal tissue showed a slight bulging and was reduced to less than one-half its normal thickness. Bowman's membrane and the anterior epithelium, also, showed some changes over the affected area.

Indeed, there is evidence (both clinical and pathological) to show that lesions of Descemet's membrane occur in some cases of keratoconus, but there is nothing to make us think that they are anything but secondary.

Some support appears to be given to the view that the essential cause of

keratoconus resides in Descemet's membrane by the result of certain experiments, such as those carried out by His (1853), Hurlimann (1860), Panas (1878), Elschnig (1894), and Plaut (1900). Those observers found that if a lesion of the posterior surface of the cornea was produced, involving the membrane of

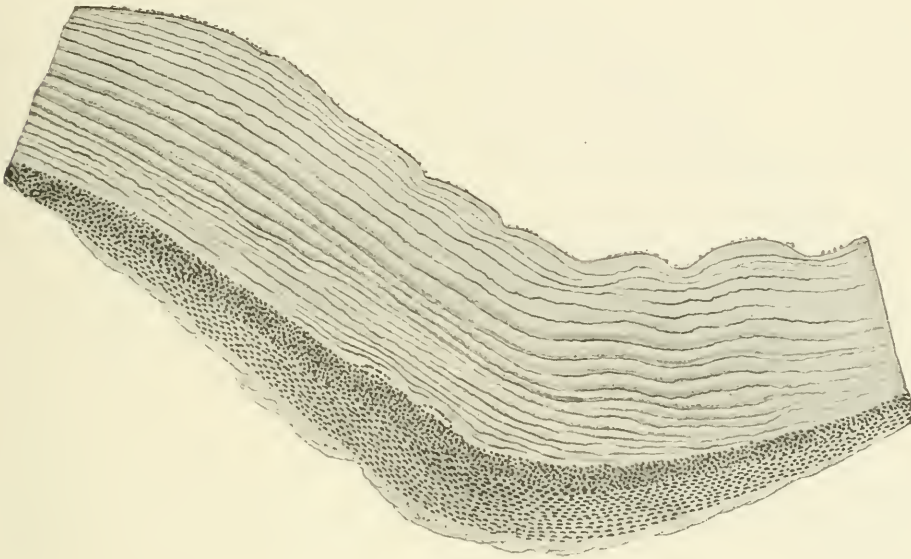


Figure 2.

Descemet,* opacity and conicity of the cornea were speedily produced. Hess and Plaut obtained the same result in the eyes of rabbits by means of the electric current. But Descemet's membrane remained intact and the posterior epithelium only was torn in several places. The cornea was thickened by cedema.

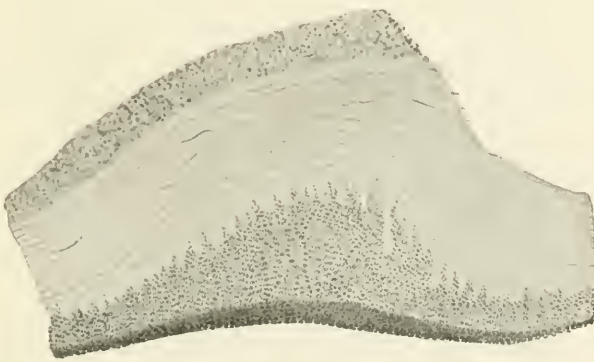


Figure 3.

The former type of experiment has been repeated upon the eyes of white rabbits by Parisotti.¹ The changes described by other authors were produced and lasted for thirteen days, when the cornea resumed its normal aspect.

*It has been shown by Leber (*Arch. für Ophthalmologie*, 1873) that there exists no impediment to filtration through Descemet's membrane, the endothelium once removed.

Somewhat later, the animal was killed, and its cornea prepared for microscopical examination. An examination of figure 2 shows that, in the region where Descemet's membrane is absent, the cornea is *bombée*; that the parts

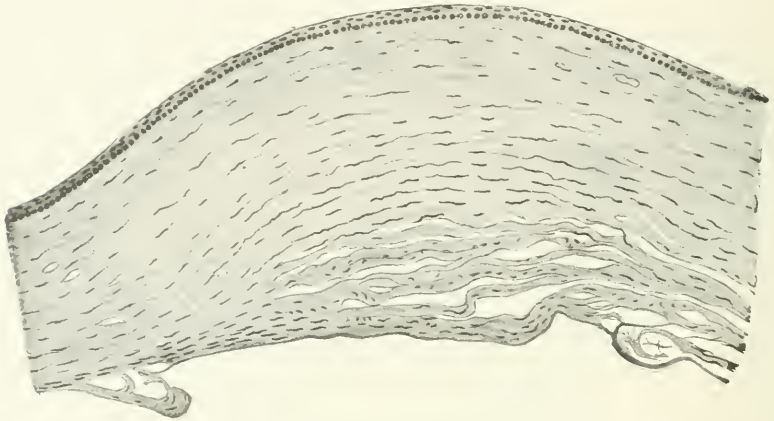


Figure 4.

stain badly, and that no corneal corpuscles can be seen; and, finally, that the anterior epithelium is hyperplastic. From figure 3 it will be apparent that the epithelium penetrates into the tissue of the cornea, and that the endothelium is also hyperplastic.

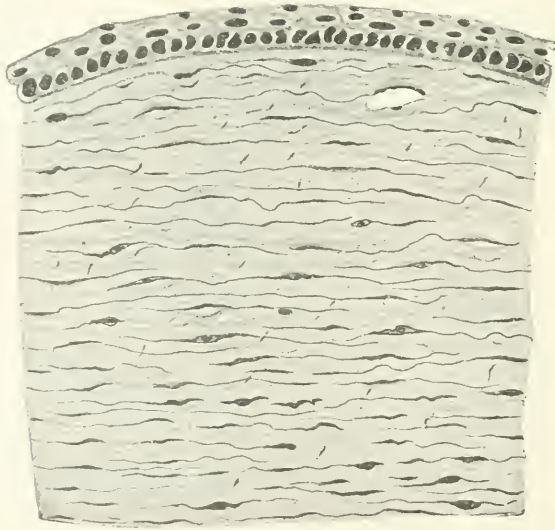


Figure 5.

Figure 4 represents the section of the cornea of a rabbit operated on the same way as the foregoing, but sacrificed on the fourth day after the intervention. It shows that the prominence of the cornea is due merely to a thickening of the tissues by œdema, a point better brought out by Figure 5, which represents a section from the same eye seen under a higher power.

It is evident, therefore, that keratoconus has nothing in common with the experimentally produced results detailed above, and, further, that the lesion seen after injuries of Descemet's membrane presents no analogy with true keratoconus.

With regard to increased intra-ocular tension, believed by several of the earlier writers to be a factor in the production of keratoconus, it is maintained by most modern authorities that in this disease tension, so far from being raised, is usually normal, if not actually sub-normal. Systematic estimations of tension by a modern tonometer, such as Schiötz's, have yet to be made.

A point of some interest, brought out by Parisotti¹, is the influence exerted by the eyelids upon the cornea. With Gullstrand and others, he regards the eccentric position of the cone with respect to the centre of the cornea as probably due to the moulding action of the palpebræ, and, in support of that view, quotes Rampoldi's case, where the ectasia was elliptical, and occupied the lower half of the cornea in a patient who was affected with ptosis.

In a case published by Lantsheere,¹² traumatism* may have been the cause of keratoconus. A wound of the centre of one cornea by a foreign body was followed by traumatic neurosis and by progressive modifications in the refraction of the eye, which, three weeks after the accident, manifested 2D. to 3D. of myopia, and then wavered between myopia and hypermetropia. Fifteen months after the injury, there was keratoconus of both eyes. Intra-ocular tension remained normal.

Kopff¹⁴ has also reported a case where a young man received a violent blow from a fist upon his right eye, known to be slightly hyperopic (0.5 D.). Some months later, the eye had become myopic to the extent of 0.75 D., and in a year, vision had diminished still further and the myopia had increased without it being possible to correct it exactly with any glass. The diagnosis of keratoconus was apparently not made at this stage. Four years after the injury, the patient was again examined, and found to present keratoconus, with myopia equal to about 8 D. at the summit of the cone, and corrected vision equal to 1/25. About three years after this note, the condition was found to be still worse, since sight of 1/25 could now be obtained only with a concave lens of 13 D. The uninjured eye remained free from keratoconus.

These two cases render it possible that conical cornea may some day form the ground of a claim under the Employers' Liability Act.

It has been held that the predisposing, if not the exciting, cause of keratoconus is to be sought in some derangement of the general health. For example, J. A. L. Bradfield¹³ stated in so many words that "some fault with the general system is always present" in cases of conical cornea. A particularly malign influence has been attributed to pregnancy by Badal¹⁴ and Valude¹⁵, to disturbances of the thyroid gland by L. Dor¹⁶ and Wibo¹⁷, and to hay fever by Thorington¹⁸.

As to the influence of general health, Parisotti¹ speaks in no uncertain voice. Here are his words.—"Speaking for myself, in the ten cases of keratoconus that I have seen among nearly 40,000 patients in my hospital and private practice, I have never met with the signs of a bad general constitution, but rather I have always seen keratoconus among people in a good state of health."

Treatment.

At the outset it is essential to distinguish between (a) progressive, and (b) non-progressive keratoconus. Action will largely depend upon what

*William Mackenzie (*loco citato*, p. 687) mentions a case where a blow upon the eye from a snowball was supposed to have led to the development of conical cornea.

decision we reach with regard to this point, as well as upon the actual state of sight at the time of examination.

Palliative Treatment.

Palliative measures include the correction of the error of refraction, as well as may be, by means of glasses, spherical, cylindrical, or sphero-cylindrical, the provision of various kinds of stenopaic appliances, contact glasses, hyperbolic glasses, hydrodiascopes, the operation of tattooing, and, finally, the employment of myotics and compression to the affected eyes.

It is seldom that sight in cases of conical cornea cannot be improved by some kind of glass. In non-aggressive cases, and in all early cases, where the visual acuity is not very seriously compromised, the optical correction may suffice. H. Bendelack Hewetson⁴⁹ at a time when the surgical treatment enjoyed great vogue, entered a plea for attempting to correct conical cornea by optical means. In an engineer affected with the disease, by suitable glasses, he brought R.V. to 20/50 and No. 1 Jaeger at 8 inches, and L.V. to 20/20 and No. 1 Jaeger at 12 inches, and nearly a year later, according to the patient's statement, the sight had "much improved." G. E. de Schweinitz⁵⁰ has seen better results from non-operative interference than from operation. He believes that if the cases are seen early enough, painstaking and repeated correction of the refractive error (very high cylinders being often required) yield satisfactory results. Under these conditions the refraction must be frequently investigated and the lenses changed according to the conditions found.

William Lang⁵¹ remarks that many cases of conical cornea can be improved by very high convex cylinders, and he mentions a couple of cases, in one of which vision was brought from $< 6/60$ to $6/9$ (with 15 D. cylinder), and in the other from $< 6/60$ to $6/12$ (with 8 D. cylinder).

Edward Jackson⁵² has emphatically said: "I cannot recall ever having seen a case of conical cornea in which better vision could not be obtained through some kind of a correcting lens."

At the same time, the determination of the correct glass required by the patient is often a most difficult and laborious affair. In reference to this point, Polack¹ remarks—"It seems to me that we sometimes capitulate too hastily before keratoconus and conclude too quickly that optical correction is impossible. Most certainly, this is often very difficult, if not impossible, but by perseverance, we sometimes arrive at encouraging results." Polack mentioned two such cases, in the first of which vision was brought to 0.3 with 12 D. sph. and 7 D. cyl. axis 30° , and in the second to 0.1 with 20 D. sph. and 15 D. cyl. axis horizontal.

Indeed, some authors, as Armaignac and Johnson, prefer under all circumstances to limit their efforts to the optical correction of conical cornea.

In the Markham v. Abrahams case it was alleged by the plaintiff that the defendant had fitted her with glasses calculated to do more harm than good. In considering this point it must not be forgotten that correction by means of glasses, no matter how exact, does not arrest the progressive development of the condition, if the tendency to such is present (Marcorelles). Moreover, there are special difficulties about fitting a patient with keratoconus with correct glasses, especially by the subjective method, which was the only one employed by the optician. It is well-known that patients affected with keratoconus find a certain amount of help from so many different glasses that their answers cannot be depended upon. It is as difficult for them to make up their minds as it is for the examiner to do so. "We should think of conical cornea," writes Parisotti,¹ "by the inconsistency of the answers of the

patient when even very different glasses are placed before his eyes." . . .
 "The glass that yields a good result at one moment fails to give it immediately afterwards."

Under these circumstances it can only be regarded as a little remarkable that the optician in question managed to bring the lady's sight from one-tenth normal to one-fourth in one eye and to one-half normal in the other with the sphero-cylindrical glasses that he sold her.

In an early communication dealing with the use of the ophthalmometer, Swan M. Burnett⁵³ expressed the hope that with the aid of that instrument many cases of keratoconus, hitherto deemed fit only for operation, might find a remedy in optical appliances. And experience has shown that much help can be often obtained in conical cornea from the use of the ophthalmometer (keratometer). Antonelli⁵⁴ recommends us to allow the patient to arrange himself as he chooses, so as to present the best part of the cornea to the readings of the instrument. It is not, he remarks, by measuring the radius of curvature of the summit of the cone or of the flattened base which surrounds the latter that we shall ascertain the correcting glass. By adopting the suggested plan, the patient voluntarily presents for measurement the particular zone of the cornea he habitually employs for sight. This seldom corresponds with the summit of the cone, for we know by experience that the ectasia occupies a paracentral position in the infero-temporal quadrant of the cornea. The visual zone usually corresponds to a central part of the corneal surface approximating to the base of the cone; and this part possessing a geometric form without symmetrical meridians, allows us nevertheless to determine the greater part of the catoptric astigmatism and thus to find the cylindrical formula of the correction that will be preferred by the patient.

In working out cases of keratoconus by means of retinoscopy, Antonelli⁵⁴ recommends that it be carried out with a square source of light. The same authority lays stress upon the occurrence in some cases of keratoconus of bioblique astigmatism—that is to say, of astigmatia that can be corrected only by two cylinders, the axes of which are not situated at right angles to one another. Finally, it is important to recollect that the glasses which are best for distance are not always those which are preferred for reading.

In the subjective determination of refraction help may sometimes be obtained from a stenopaic slit.

A special use of the appliance has been described by George Mackay.⁵⁵ By means of an opaque disc, perforated with a hole of from 3 mm. to 5 mm. diameter, mounted in the trial-frame, he cuts off every part of the cornea except the limited area where the retinoscopy is to be practised. By adopting this device he obtained in a case of keratoconus vision of 6/12 in the right and of 6/18 in the left eye. Mackay applies the same idea to treatment, and prescribes a pair of spectacles having the posterior surface of each glass coated with opaque black varnish in such a way as to leave a central clear area, 2 mm. in diameter. Antonelli⁵⁴ does not agree that the best sight is to be obtained, as in Mackay's plan, by utilising the central part only of the cone. In his opinion, the ophthalmometer is preferable, inasmuch as it allows us to judge if relief can be obtained from optical correction and in what way the subjective examination should be conducted. This criticism does not appear to be altogether justified. Mackay apparently does not estimate the refraction of the centre of the cone, as assumed by Antonelli, but by getting the patient to look through the hole in the disc, allows him to select that portion of the cornea which experience has taught him is the best for visual purposes.

A point has been raised by J. A. L. Bradfield,⁴³ who insists that in

keratoconus the proper glass should be determined without the use of a mydriatic. H. D. Noyes⁵⁶ also laid some stress upon the same point; and Edward Jackson⁵⁷ stated that as a glass can correct only the most regular part of the cornea, such a glass should be situated before the pupil when contracted, as it is in near vision and in bright light. C. D. Wescott and Brown Pusey⁵⁸ have related a case where the glasses selected during and after complete cycloplegia were very different. A man, aged 23 years, when examined under the influence of atropine:—L.E. *minus* 6·5 D. with *minus* 6·00 D. axis 170° (V.=6/15); R.E. *minus* 3·0 D. with *minus* 2·50 D. axis 180° (V.=6/15). When the mydriasis had passed away, better sight was obtained with the following cylinders:—L.E. *plus* 6·50 D. axis 25° (V.=6/15); R.E. *plus* 4·0 D. axis 150° (V.=6/15). The result of wearing these cylinders appears to have been satisfactory.

Cases have been reported by H. V. Würdemann,⁵⁹ J. W. Dunn,⁶⁰ and W. E. Brunner⁶¹ where the best visual results were obtained in conical cornea not with negative glasses, as is usual, but with positive spheres and cylinders.

When it comes to actual correction of the visual defect, the familiar "pin-hole" may be of greater service than any optical combination. For example, de Lapersonne,¹ like Wicherkiewicz,¹ speaks highly of a stenopaic hole (as opposed to a stenopaic slit) as a means of improving sight in cases of conical cornea. Many of his patients, we gather, prefer that means for near-work to the exclusion of glasses and of stenopaic slits.

That the condition may remain stationary under optical treatment is attested by Sauvineau's case.⁶²—When a lady, aged 47 years, was first seen in September, 1894, her condition was as under—R.V. *minus* 2 D. sph. with *minus* 6 D. cyl. axis 60°=3/10, L.V. *minus* 2 D. sph. with *minus* 6 D. cyl. axis 120°=1/20. Fifteen years after the patient was first examined—R.V.=4/10 and L.V.=1/16.

The idea of a so-called "contact" glass for the relief of keratoconus dates from a suggestion made in the year 1845 by the famous astronomer Sir John F. W. Herschel.⁶³ The following were his words:—"Should any very bad cases of irregular cornea be found, it is worthy of consideration, whether a temporary distant vision could not be procured by applying in contact with the surface of the eye some transparent animal jelly contained in a spherical capsule of glass; or whether an actual mould of the cornea might not be taken and impressed on some transparent medium. The operation would, of course, be delicate, but certainly less so than that of cutting open a living eye and taking out its contents."

Attempts towards realising Herschel's suggestion were made by Fick (1888), Kalt (1888), Sulzer (1891), and Dor père (1892). Although by many authors these contrivances are looked upon as somewhat impracticable, yet Antonelli⁶⁴ has related a case where contact glasses were of great assistance. His patient, a lady, was fond of the theatre, and once seated in her *loge*, she slipped the contact glasses under her eyelids, without the aid even of cocaine, and wore them during the entire performance. She also found them useful when she drove in the afternoon. By their aid the left eye had vision of 0·8 and the right eye of 1·25 Snellen.

Hyperbolic glasses, introduced by Raehlmann⁶⁴ in the year 1879, do not appear to have gained any large measure of popularity in cases of conical cornea. Raehlmann's glasses were 4 cm. in diameter, and the first cone of the series had a depth of 0 mm. 005, the second of 1 mm., and the third of 2 mm. Dor⁶⁵ adopted a scale of 2 mm., 2·5 mm., and 5 mm. Such glasses, according to Parisotti, correct the vicious curvature of the cornea at least as efficiently as the stenopaic disc.

The "Hydrodiascope" was invented by Lohnstein⁶⁶ in 1896, and although intended originally for a case of irregular astigmatism, has been applied for the relief of conical cornea. It really represents a modification of the earlier "Orthoscope" of Czermak. The underlying idea of the appliance, of course, is not to correct the refraction of the cornea, but rather to do away entirely with the refraction of that structure. A lukewarm physiological solution of common salt is contained in the appliance (shown in figure 6), which covers the front of the eye, the static refraction of the cornea and anterior chamber being replaced by a planoconvex lens which forms the front part of the apparatus. The "Hydrodiascope" is worn like an ordinary pair of spectacles.

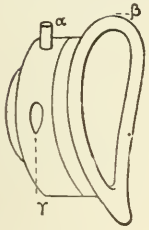


Figure 6.

Majewski⁶⁷ has observed in persons affected with astigmatism or keratoconus an improvement in the powers of sight by employing a modified form of the "Hydrodiascope." Wicherkiewicz¹ prefers the instrument, as modified by Majewski, to contact glasses, and he mentions cases, the sight of which was brought to 5/10 or 8/10 by its aid. On the other hand, H. Coppez¹ recommends Siegrist's improvement of Lohnstein's appliance. Siegrist has added a series of convex lenses running by half dioptres from 23 D. to 30 D. By sliding these glasses successively in front of the "Hydrodiascope," the one that suits the patient best is found, and that is added to the instrument made for his special use. The price is moderate (about 25 francs). Vision may sometimes be raised to 5/10 or 8/10 and the smallest characters may be read. Coppez mentions the case of a young dressmaker affected with double keratoconus, who wears this apparatus for eight hours a day without discomfort. By its aid, she works and reads easily.

Among the disadvantages attending the employment of the "Hydrodiascope" Antonelli⁶⁴ enumerates the following:—(1) the fact that the apparatus is not water-tight; (2) that movements of the face allow of fluid escaping down the cheek; and (3) that when worn, it produces a troublesome escape of fluid from the nostrils.

As Parisotti¹ says, "Lohnstein's instrument is the solution of a purely scientific problem, but it is far from constituting a remedy which readily satisfies the patient." Whether the instrument recently designed by Rayner D. Batten⁶⁸, the "Hydrophthalmoscope," comes any nearer to fulfilling the ideal conditions yet remains to be seen. It is shown in figure 7.

Attempts were made to modify the curvature of the cornea by means of subconjunctival injection by Deschamps⁶⁹ (1903), and the observation has been utilised by Senn⁷⁰ in the treatment of keratoconus. The visual acuity in Senn's case improved in the right eye from 0.25 to 0.8 and in the left from 0.05 to 0.2.

The employment of myotics, as pilocarpine, with compression of the eyes by means of a bandage applied at night, is a measure that has its advocates, more especially in the earlier stages of conical cornea. It should be recognized that the treatment by these measures is an affair of months or of years. A rapid result, such as that obtained by Steinheim⁷¹ after six weeks of such treatment, is altogether exceptional. In his patient, six months' treatment on these lines brought the visual acuity to No. 3 Jaeger at 4 inches and No. 1 Snellen at 3 inches. Koenig¹ mentions a case of keratoconus, in a man of 22 years, completely cured by compression, myotics, and cessation of study. Operation had been proposed to, and refused by, this patient.

Jocqs¹ is persuaded that compression is a most efficacious method of treating the disease. One of his relatives, afflicted with grave keratoconus of both

eyes, was cured by that simple means, and he mentions another case (under the care of Panas) where the same happy result followed compression. The compression, exercised by the aid of a caoutchouc bandage,* should be carried out both by day and by night—during the day one eye alone is bandaged, and during the night both. An appreciable result will be produced after a year of this treatment. Jocqs states that compression may set up iritis, particularly in eyes of low tension. de Lapersonne,¹ who agrees that compression, with or without myotics, yields good results at the end of two or three years, does not believe, with Jocqs, that it is ever responsible for inflammation of the iris.

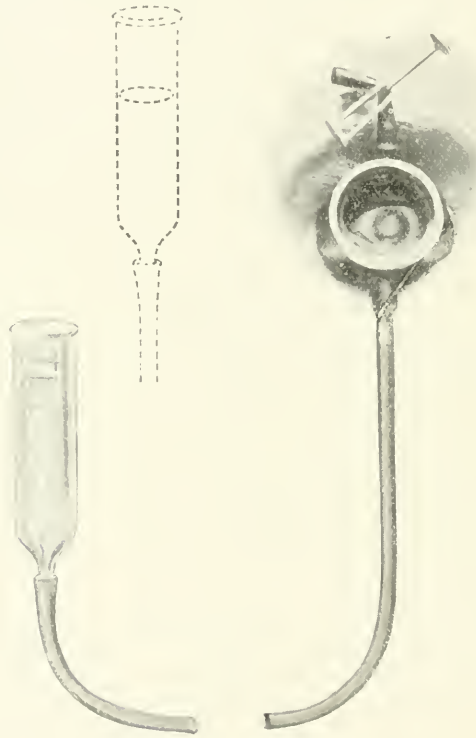


Figure 7.

With the idea of doing away with the effects of accommodation, A. Terson² has substituted mydriatics for the prolonged use of myotics in the treatment of conical cornea.

As an additional means of compression, canthoplasty has been suggested by Gullstrand. In the same order of ideas A. Terson has occluded the palpebral fissure by tarsorrhaphy, and details of cases treated in this way have been published by Kalt and Terrien. In Kalt's case sight was improved from $1/10$ to $1/3$. The lids, of course, should not be separated for months or for years.

In passing, it may be noted that in 1836 Lisfranc performed central tarsorrhaphy in a case of opaque staphyloma of the cornea.

The operation of tattooing has been employed with three different ends in conical cornea. First, in order to arrest the progressive deformity of the cornea by Grandclément, who believes that the Indian ink employed in the

*Bourgeois,¹ however, regards an elastic bandage as dangerous.

process tans, as it were, the attenuated portion of the membrane. Secondly, in order to render a leucoma resulting from the cautery less conspicuous (Salva). Thirdly, to diminish dazzling from translucency of the post-operative cicatrix (Rochon-Duvigneaud).

Radical Measures.

If the foregoing measures, singly or in combination, fail to modify the abnormal curvature of the cornea, or if the sight be extremely bad, we must (however reluctantly) interfere surgically. "The results of surgery," writes Parisotti¹, "are always less harmful than the course of the disease when left to itself."

Apart from such operations as removal of the lens, iridodesis (single or double), trephining, iridectomy, and so forth, which have nowadays been generally abandoned, we have at our disposal several practical measures for dealing with keratoconus.

Parisotti¹ counsels us always to begin with the most harmless means, such as paracentesis, peripheral sclero-corneal incisions, and especially incisions at the base of the cone, as recommended by Schiess-Gemuseus. On the other hand, in cases that are advancing so rapidly as to brook no delay, the most rational surgical treatment is by the cautery.

Parisotti speaks almost enthusiastically of the operation devised by Schiess-Gemuseus, who transfixes the base of the cone with a very narrow Graefe knife, making the puncture and counter-puncture 3mm. in width. A few days later, a second transfixion, perpendicular to the first, is practised.

On the contrary, he has nothing good to say of resection of the cone, an operation performed for the first time by Bader⁷² in the year 1872, and repeated with excellent results by several British ophthalmic surgeons, as C. Higgins⁷³ and A. Quarry Silcock⁷⁴, since then. In one of Higgins's patients, a girl who was unable to count fingers prior to operation, vision rose eight months after excision to 20/50 and Snellen $1\frac{1}{2}$ (0.5). In Silcock's case, the excision of a wedge-shaped piece from the apex of the cone improved vision from 20/200 to 20/20 (letters) (corrected with — 5.0 D. cyl.). Indeed, some of the cases treated in this way by A. S. Morton⁷⁵ yielded astonishing results.—For example, a woman, aged 32 years, had suffered from conical cornea for ten years. R.V. = less than 6/60 and No. 1 Jaeger at 2 inches; L.V. = less than 6/60 and No. 2 Jaeger at 2 inches. The apex of each cone was excised. More than twenty years after the operation, V. = No. 1 Jaeger at 12 inches, and (with correction) 6/9. Morton transfixes the apex of the cone with a long, narrow, and stiff Graefe knife, the edge of which is then turned forwards and a little to the right. The knife is pushed steadily onwards until it cuts its way out through the cornea to the right of the apex of the cone, thus forming one edge of the elliptical piece to be excised. The flap is seized with fine forceps, and the elliptical excision is completed with the knife.

The dangers which attend this operation are: (1) anterior synechia; (2) iritis and posterior synechia; (3) increased tension; and (4) hypopyon.

As a variant on this operation (in which no sutures are used*), Stoewer⁷⁶ covered the defect left by excision of the apex of the cone with a 5 mm. flap of ocular conjunctiva, cut from the nasal side, and drawn into position by a suture. The sight of an eye operated on in this way improved from fingers to 4/20.

*Badal¹¹ lays stress upon the employment of horse-hair sutures, passed before excision of the corneal flap.

In cases where the cone is very prominent, Parisotti¹ recommends an operation originally practised by Quadri⁷⁷ (1855) for staphyloma. Noiczewski⁷⁸ was led to advise this procedure in keratoconus by the observation that conicity of the cornea disappeared after cataract had been removed from the affected eye. The facts were as follows. — A more or less linear section was made below the cornea, and iridectomy was performed. On the next day it was noticed that the inner edge of the corneal wound did not lie in apposition with the scleral wound, but overlapped it for 0.5 mm. to 1.5 mm. On the following day, the edge of the wound was removed, and the parts then quickly healed. During this process the keratoconus disappeared. When the patient was seen five years after the operation, the cornea was normal as regards its form, and was, besides, completely clear. In this case, then, a keratectomy performed in one direction exerted an influence upon all the meridians of the cornea.*

The ultimate effect of the foregoing procedure is to bring a piece of sound cornea opposite the pupil. The displaced part, once removed from the pupillary region, may be treated with agents provocative of sclerosis, since in the new position the resulting leucoma matters relatively little.

An operation devised and practised by H. Coppez⁷⁹ belongs to the same order. That surgeon first determines with the ophthalmometer if there exists any orientation in the cone. He then cuts a corneal flap, analogous to that made in cataract, in the region of the radius where the mires of the ophthalmometer have their maximum intersection. The corneal section is furnished with a conjunctival flap, the height of which is 4 mm. Two millimetres of the conjunctival flap are resected, and the base of the last-named is sutured to the remaining ocular conjunctiva, taking up the superficial parts of the sclera also. A fortnight later, after fresh ophthalmometric measurements, the same operation is practised upon the radius perpendicular to that first selected. By these means (stated to be capable of modifying an astigmatism of 10 D. to 12 D.), the cornea is stretched in all directions, without damage to its transparency. Three patients upon whom the operation was performed now read well enough.

We may now pass forward to consider those methods of treatment which are the logical outcome of the pathogenic conception of the disease, namely, that keratoconus is the consequence of a lack of resistance in the central parts of the cornea, so that the latter yields even to the normal intra-ocular pressure. Under these circumstances the indications are: (*a*) to diminish the pressure, or (*b*) to augment the resistance, or (*c*) to attain both these ends at one and the same time.

In order to diminish pressure, paracentesis (Chelius, Desmarres, Rosmini), drainage of the anterior chamber (Flarer, Businelli), sclerotomy (de Wecker), sclerectomy (Pascheff, Lagrange), and iridectomy (Wilde, v. Graefe, Badal, Rollet, Motais, Dransart, Truc, Stedman Bull) have been tried and, for the most part, given up.

In order to replace the enfeebled tissue of the cornea by cicatricial tissue, the outstanding means is by the cautery, actual or galvanic. An attempt has also been made to encourage the formation of cicatricial tissue by tattooing (Desmarres, Hirschberg, Motais). Chemical agents, such as silver nitrate (Sichel, v. Graefe, Meyer, Horner) and alum (Bradfield), have been employed with the same end in view.

The application of heat to the cornea for the cure of keratoconus did not become general until after the introduction in 1879 by Gayet of the galvanocautery, although even then some surgeons, as Panas and Emrys Jones,

* Androgski (*Rev. Gén. d'Ophtal.*, 1902, p. 260) obtained V. = 0.5, without glasses, in a patient with keratoconus from whom he had removed cataract.

remained true to the Paquelin cautery. The advantages of the galvanic wire, however, are nowadays appreciated by almost everybody. They are: first, the avoidance of heat radiating to unaffected parts of the cornea; secondly, the ease whereby the action can be limited to a given point.

At the same time it is only right to say that some excellent results have been obtained with the actual cautery by American and British ophthalmic surgeons. Chisolm,⁸⁰ of Baltimore, reported a case of keratoconus (associated with exophthalmic goitre) improved from fingers at one foot to fingers at six feet by thrusting a fine sewing needle, heated to whiteness in an alcohol flame, through the apex of the cone. Edwyn Andrew⁸¹ advocated the treatment of conical cornea by burning a minute opening through the apex of the cone with the finest-pointed actual cautery that could be obtained. The underlying idea was that the slow drainage of the aqueous humour through the tiny aperture made with the cautery would tend to the rest and to the contraction of the cornea. In support of his treatment he related the case of a female, 28 years of age, whose sight with the right eye before operation was 20/200 and No. 1 Jaeger at four inches, and with the left eye, fingers. After operation she obtained R.V. 20/70 and No. 1 Jaeger



Figure 8.

at six inches and L.V. 20/200 (with great difficulty) and No. 1 Jaeger at $2\frac{1}{4}$ inches. W. J. Cant⁸² treated a girl by the same method. As soon as the wound had healed, the sight (less than 6/60 before operation) was 5/9. Richard Williams,⁸³ also, got good results with the actual cautery, although he was strongly adverse to perforating the cornea during the operation. In one of his patients, a man, aged 22 years, sight improved in about four months from less than 6/60 and letters of No. 16 Jaeger to 6/36 and No. 4 Jaeger at 5 or 6 inches. There was a complete absence of conicity, and the scar appeared to be firm and strong.

G. A. Berry⁸⁴ recommends the use of a home-made stenopaic circle for determining whether operation is likely to succeed or not. The appliance is made by blackening an ordinary glass microscopical slide in a smoky flame, and then scratching a small circle, 2.5 mm. in diameter, some distance from one end of the slide. The patient holds the clear ring in front of his pupil, and his powers of reading are estimated with and without the stenopaic contrivance. When improvement is obtained by this means, Berry's experience teaches him that permanent improvement may be obtained by producing an apical nebula of the cornea by surgical measures.

There has been, and still is, a wide diversity of view as to whether the cornea should or should not be perforated by the glowing wire, and there is doubtless something to be said on both sides of the question. Since the published cases, however, failed to yield conclusive results on this important point, Parisotti¹ endeavoured to settle the question by reference to experimental results. The central part of the cornea of four rabbits was cauterised deeply with a very fine wire, and the animals were killed on the third, tenth,

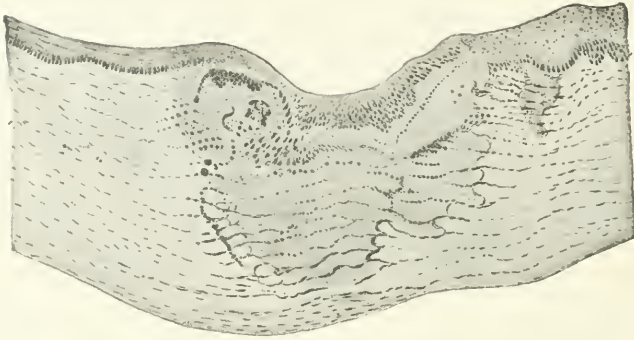


Figure 9.

nineteenth, and twenty-ninth day respectively after the operation. The corneæ were fixed by immersion for several hours in a 10 per cent. solution of formol, and were then passed through alcohol of various strengths. Figures 8 to 15 show the histological changes found at the various periods.

As regards the first rabbit, that sacrificed on the third day after cauterisation, an eschar, which became detached when the eye was removed, marked the place where the wire had been applied. The eschar was surrounded by a greyish halo. Very similar macroscopic changes were found in the corneæ of the other animals killed at a later period. In none was there the least sign of reaction.

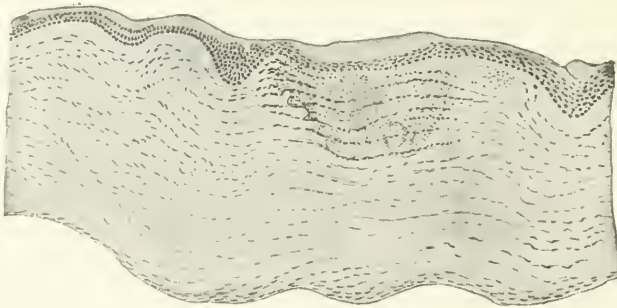


Figure 10.

The microscopical appearances in the cornea of the first rabbit are shown in figure 8, *viz.*, a cavity filled with the masses of necrotic tissue, and hyperplasia of the epithelium. From figure 9 it is evident that the proliferating epithelium is derived from the epithelium at the edges of the cup. Figure 10 shows proliferation of the nuclei without any trace of cellular infiltration.

Figure 11 represents a section from the cornea of the second rabbit, namely, that killed on the tenth day. The aperture made by the galvanic wire is filled with epithelial tissues, and lying at the sides of and beneath this cicatricial plug there is a certain amount of cellular infiltration, although no polynuclear cells can be found.

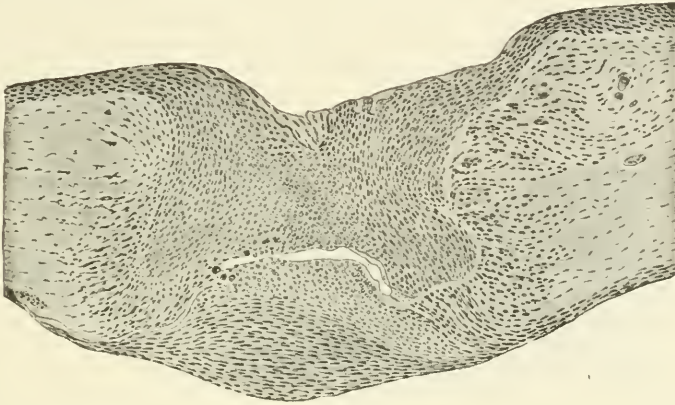


Figure 11.

Descemet's membrane lies between two masses of cellular exudation in such a way as to tempt one to think that one layer is derived from the anterior and the other from the posterior epithelium.

In figure 12 the proliferated tissue, which, in figure 11 was situated on the two sides of the epithelial plug, is shown as a continuous structure, the section having fallen to this or that side of the plug in question.

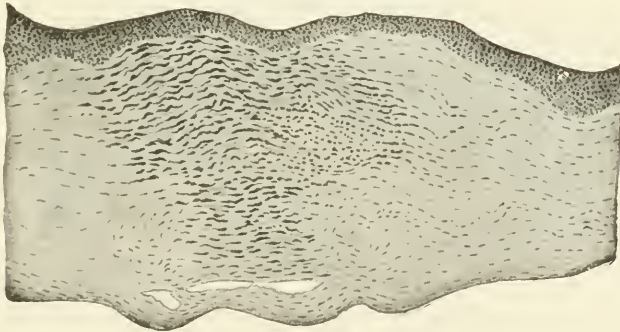


Figure 12.

The cornea of the third rabbit, that killed on the nineteenth day, shows the corneal tissue to be replaced by connective tissue of new formation (figure 13). This change, as well as the hyperplasia of the epithelium, is also well brought out by figures 14 and 15. The membrane of Descemet is intact, inasmuch as the section is made at some little distance from the spot at which the cautery was applied.

From the experiments briefly outlined above, Parisotti claims to have shown : first, that after cauterisation, centripetal traction leads to flattening of the cornea ; and, secondly, that the effect of the cauterisation extends more or less to the whole of the cornea.

Cauterisation with perforation of the cornea, Parisotti believes, yields a much better result than a cauterisation which leaves some layers of the cornea intact. In effect, when intact layers are left, a cicatrix may be obtained which looks very satisfactory, but a more or less serious obstacle is opposed by the intact layers to retraction and consequently to flattening of the cornea.

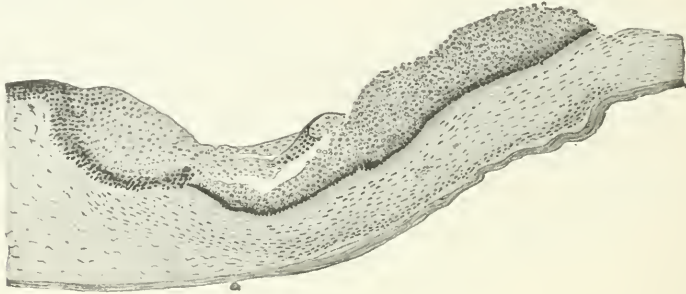


Figure 13.

Parisotti believes that, except in absolutely inexperienced hands, perforation of the cornea with the galvano-cautery offers no particular dangers. Should a pre-pupillary leucoma be the outcome of the operation, sight will be given by means of a small iridectomy, but it must be remembered that in this event the artificial pupil is made simply for optical purposes, and not with the idea of reducing the intra-ocular pressure. Hermann Knapp⁸⁵, however, found in one

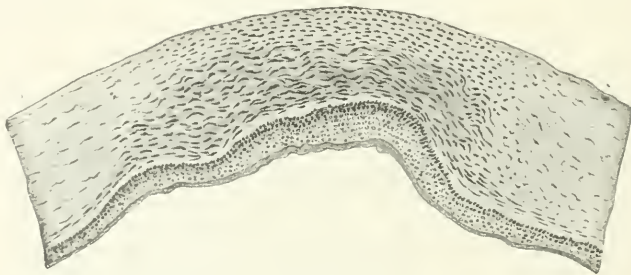


Figure 14.

case that the heat had produced a cataract, and in another that glaucoma set in after the corneal fistula had closed. Kipp⁸⁶ mentioned a case where the eye was well for six weeks, and then the cornea sloughed.

As to *technique*, there have been several suggestions, some of the more important of which may be glanced at :

Marcus Gunn⁸⁷ applied the galvano-cautery not to the apex of the cone, but at a distance of about 2 mm. below the latter, so as to avoid interfering with central vision.

Sir Anderson Critchett,⁸⁸ who does not perforate the cornea with the cautery, adopts the following plan.—By means of a flat electrode at a very low

heat, the whole of the affected portion of the cornea is lightly cauterised. At a slightly increased temperature, the electrode is next applied within the area marked out by the first application. Finally, using a smaller cautery point at a dull maroon heat, the centre of this second zone is burned deeply, but without perforating the cornea. Three distinct zones of varying depth are thus made, the whole bearing some resemblance to a target, and, according to Critchett, these exercise a graduated pressure upon the affected parts of the cornea*.

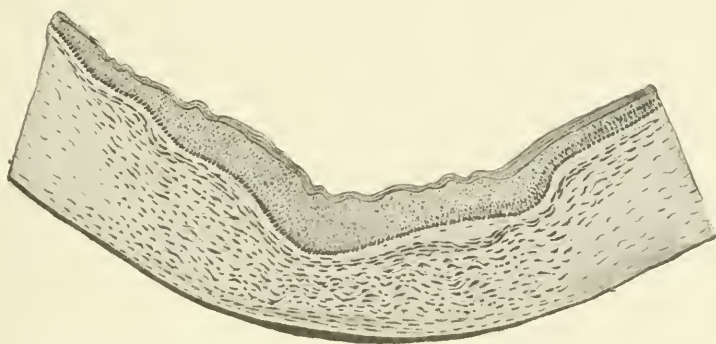


Figure 15.

H. Work Dodd⁵⁰ makes a series of deep, punctate dots with the galvano-cautery around the cone, but leaves the centre of the latter intact and does not perforate the cornea.

Fieuzal¹ makes a couple of semi-lunar cauterisations, one on the nasal and the other on the temporal side of the cone, with the convexity directed towards the periphery of the cornea.

Elschnig⁵⁰ tries to secure vascularisation of the scar, which thereby becomes denser and in that way facilitates flattening of the cone. The operation, as shown in figure 16, consists in deep cauterisation of the apex of the cone (*a*), along with superficial cauterisation of a band of cornea connecting the apex

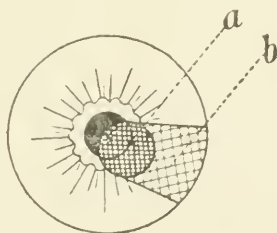


Figure 16.

with some point in the neighbouring limbus (*b*). Vessels extend along this track into the scar, which should be placed in such a way as to leave part of the pupil available for future sight. Vision may be improved still further by tattooing the resulting cicatrix. Elschnig reported two cases treated by his method, in one of which visual acuity, 1/10 before operation, rose to 6/18 after, and the other from fingers at 1½ inches to 6/24.

* In few of the cases operated on was it found necessary subsequently to perform an optical iridectomy. Exact figures were :—one iridectomy in six cases treated with the galvano-cautery.

Abadie⁹¹ endeavoured to modify the abnormal curvatures of the cornea, to avoid a central opacity, and to reduce the chances of consecutive complications to the lowest point by applying the galvano-cautery to the periphery of the affected cornea. By means of a very fine terminal, he burned a deep V-shaped trench in the true corneal tissue, concentric with the circumference of the cornea, and at about 2 mm. distance from the limbus. The cauterisation involved a portion only of the circumference.

The latest suggestion is by Angelucci⁹² (1910), who combines cauterisation and perforation of the cornea with the application of a fine interlamellar suture. The suture is passed in and out of the stroma of the cornea in such a way as to encircle the conical protrusion, and is then tied. In a rabbit treated by these means Angelucci found that the cornea, which was much flattened, presented a diminution of refraction of 6 D. in the vertical and of 10 D. in the horizontal meridian. He performed the operation upon a young woman suffering from keratoconus, with opaque summit, in whom sight had been brought to 5/120 after the performance of an iridectomy and the provision of glasses of 14 D. The ophthalmometric image is shown in Figure 17. The suture was first passed; then, the summit of the cone was cauterised deeply; after that, the cornea was pierced with a fine Graefe knife; and, lastly, the suture was tied. Figure 18, made after the operation, shows



Fig. 17.



Fig. 18.

the notable flattening obtained and the reduced inequality of the refraction. Five months after the operation, sight with 11 D. was 5/40 and the woman could read without glasses No. 0.50 de Wecker at 10 cm.

After-treatment, of course, is necessary when the galvano-cautery has been applied. When the cornea has been perforated, atropine should be used, while, in the contrary event, pilocarpine or physostigmine is employed, and also in all cases when cicatrisation is completed. Compression should be applied until such time, at least, as the parts are soundly healed.

The results of treating keratoconus with the galvano-cautery are sometimes most gratifying. For example, Haltenhoff¹ had a case where vision after operation reached 1/3 with a *minus* 2 D. spherical glass, and Bocchi,¹ whose patient before operation could scarcely count fingers at 1.5 metres, succeeded in obtaining a visual acuity of 20/50 with a spherical lens of *minus* 2.50 D. Terrien⁹³ (who invariably perforates the cornea with the cautery) reports a case where sight of 1/2 was obtained by a patient who prior to operation had 1/10 only. A case is mentioned by Deschamps¹ where a country clergyman, affected by conical cornea, was unable to read a single word. After the galvano-cautery, followed by small iridectomies, he recovered so much sight that he could follow his usual occupation, and when the facts were reported, cure had already lasted for ten years. Landolt¹ speaks of a patient whose sight remained good fifteen years after treatment with the galvano-cautery.

No exact figures were given, but when the patient was last met, he was reading his Baedeker and enjoying the sights of the city. C. Higgins⁹⁴ obtained No. 1 Jaeger in a patient who before operation could read No. 2 Jaeger with the right, and No. 14 Jaeger with the left eye. R. W. Doyné⁹⁵ improved vision from No. 20 Jaeger to No. 1 Jaeger at 4 inches. Sir Anderson Critchett⁸⁸ had a patient whose vision, 6/60 prior to operation, had risen to 6/9 six months after operation. In two other cases vision of 6/60 was brought to 6/12. McHardy's patient⁸⁸, treated by the Critchett plan, recovered sight of 6/6 ptly., in an eye that had been practically of no use. In Tatham Thompson's patient⁸⁸, also treated by the same method, vision prior to operation was equal to the counting of fingers at a distance of two feet and to reading No. 16 Jaeger. A year later, the man was driving an hotel omnibus.

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THE RESPONSIBILITY OF OPTICIANS.*

Action for Negligence.

MARKHAM v. ABRAHAM.

Before the LORD CHIEF JUSTICE and a Special Jury.

This was a claim for damages for negligence.

Sir F. Low, K.C., Mr. Greer, K.C., and Mr. C. G. Davies appeared for the plaintiff; and Mr. McCall, K.C., Mr. Profumo, and Mr. A. Leach appeared for the defendant.

* See *THE OPHTHALMOSCOPE*, December, 1910, p. 894.

Sir F. Low, in opening the case, said that the plaintiff was a daughter of a Nonconformist minister, and was at the time material in this action preparing to be a science teacher. She had passed certain examinations, and was working for the final, and after passing that she would have been able to start work. In 1907 she was having trouble with her eyes, and was suffering from pain, dizziness, and difficulty in reading. She consulted the defendant, one Thomas, who carried on business at Manchester under the style of Wood Abrahams. He described himself as an "eyesight and spectacle specialist" and a "qualified optician of London," and stated that his "consulting hours" were from 9 a.m. to 6 p.m. On the first occasion when the plaintiff called at the shop she saw an assistant, who prescribed glasses.

She still, however, had trouble, and during 1908 and 1909 she paid further visits to the shop, and was interviewed by one or other of the assistants, except on one occasion, when she saw the defendant himself. No improvement was effected, and in 1909 she was given special spectacles for reading. At last she went to consult a surgeon-oculist, who found she was suffering from conical cornea, and told her that the disease was evidently of long standing and that her condition had become very bad; and the result was that she had to abandon all hope of a career as a teacher. He submitted that if the defendant had exercised reasonable care and was possessed of reasonable skill he must have seen that it was a case of disease and not one of ordinary short sight. Supplying spectacles was merely playing with the matter.

The defendant had represented himself as a specialist and was bound to show reasonable care and skill as such, and he could not now avoid liability by saying that he was merely a tradesman engaged in the sale of spectacles.

The plaintiff, called by Mr. Greer, gave evidence bearing out her counsel's opening statement.

Cross-Examination.

Cross-examined by Mr. MCCALL.—The only sums she paid the defendant were 25s. and 15s. 6d., and those sums were paid for the spectacles and glasses which he supplied her with. She was not in Manchester more than two or three times in 1907 and 1908 except when she went specially to the defendant's. She was recommended to go to the defendant by a member of her father's congregation who had got spectacles from him.

When she first went to the shop she saw an assistant, Mr. Ensor, who tested her sight and used an instrument for throwing a strong light into her eyes. So far as she could tell they took the greatest care to find out what glasses would suit her, and when she got the glasses she found she could see considerably better than before. Finding some alterations were necessary she took the glasses back, and the defendant altered them without charge. Mr. Ensor told her she was suffering from astigmatism. When she saw the defendant himself she told him she had been studying very hard, but she did not remember his saying reading was bad for her eyes.

Charles Wray, called by Mr. Greer, said he was an F.R.C.S. of England and held a number of ophthalmic appointments, and had had a very wide experience as an oculist for 25 years. The existence of the disease conical cornea was quite easy to discover. Where it existed it was essential to be extremely careful in the selection of glasses, and reading, writing, and all work at reading distance must be strictly forbidden. The patient must be made to go to bed early, and everything must be done to keep the general health in the best possible condition.

Astigmatism was always present in conical cornea and might also be present in ordinary short sight. In the plaintiff's case the existence of the disease ought to have been discovered long before, and the glasses supplied by the defendant were quite unsuitable. The plaintiff came to consult him in November, 1909, and he found she must have had conical cornea for at least eight years. If she had been properly advised in 1907 the progress of the disease could have been much retarded. She was not fit now for any occupation for which sight was required.

Cross-examined by MR. MCCALL.—It was not true that he had long held a strong view that no optician should be allowed to prescribe spectacles unless he was a qualified oculist. But unless an optician could at least tell whether a pupil was healthy or not he should not be allowed to prescribe spectacles. Conical cornea was a rare disease, and perhaps one in a thousand of his eye patients would have it. The only fault he could find with the spectacles supplied by the defendant to the plaintiff was that they were not strong enough.

Further expert evidence having been called, the plaintiff's case was closed.

The Defendant's Case.

MR. MCCALL, for the defence, said the question of the last importance in this case was, What was the duty which a person in the position of the defendant owed to a person in the position of the plaintiff? The defendant did not profess to be a person able to diagnose and cure diseases of the eye, but was simply a maker and seller of spectacles. A chance customer came in and asked for spectacles to let her see better; she was tested, not for disease, but to find what spectacles would best assist her sight, and the defendant was only paid for supplying those spectacles, not for examining for disease. And after she had had them for some time she came back and said the spectacles had been very successful.

Luther Ensor, called by Mr. PROFUMO, said he had had eight years' experience in testing eyesight. In 1907 he was acting as assistant to the defendant. He remembered the plaintiff calling. He tested her eyes and told her she was astigmatic, and supplied her with spectacles which he told her would enable her to see better. He had not made a study of the diseases of the eye. There were occasions when they recommended customers to consult an oculist; they did that when they considered the results of their own tests unsatisfactory.

Cross-examined by Mr. GREER.—The astigmatism which he found might be caused by disease and might not be only a normal defect. If he had known or suspected the case was one of conical cornea he would have sent the plaintiff to an oculist. He had never seen a case of conical cornea himself, nor had he attended any lectures on eye diseases. If he had known that she had come back more than once still making the same complaint he would have thought it unusual, and would have thought it prudent to advise her to consult an oculist.

Re-examined by Mr. MCCALL.—He never heard that the plaintiff did come back to complain.

The Defendant's Evidence.

Richard Thomas, called by Mr. MCCALL, said he was an optician carrying on business at Market-street, Manchester. He had been 22 years in business as an optician, and bought this business in 1904. He possessed the certificate of the British Optical Association. He had had no training or experience in diagnosing or dealing with diseases of the eye. When the plaintiff called in

1907 he did not see her, nor was his attention called to her case. The first time he personally dealt with her was in April, 1909. After he had examined her he heard she had been to the shop before. She said she wanted some glasses to enable her to read better than those she then had, and he supplied some accordingly. That was the only occasion on which he saw the plaintiff as a customer or supplied her with glasses. She said she had been studying for an examination and working night and day, and he told her to read at intervals and take rests.

He saw nothing to make him think it necessary to send her to an oculist, though he often did send patients on if he detected cataract in a pronounced form or if his tests were not satisfactory.

Cross-examined by SIR F. LOW.—It was right to describe him as an optician. His billheads described him as an eyesight specialist; he was an ordinary optician and something more. He had the diploma of the British Optical Association, but that did not set out the qualifications of an eyesight specialist, nor had he any other document to show them. His letter-paper also showed that he had "consulting hours," but he had now altered that to "business hours." When he took over the business from Mr. Wood the word "consulting" had been printed on the paper, but he did not like it and gave it up; that was not in consequence of this case.

The plaintiff complained to him that reading hurt her eyes and said she had headaches, but he did not at the time know that she had complained of the same symptoms to his assistant two years before. Beyond being able to detect an advanced cataract he was entirely ignorant as to diseases of the eye or how to detect them. If the customer was satisfied with the glasses supplied he had done his duty as an eyesight specialist, and it was not for him to discover disease.

Re-examined by Mr. MCCALL.—The plaintiff never asked him whether there was any disease in her eyes.

At this point the hearing was adjourned.

* * * *

The hearing of this action was resumed.

Sir F. Low, K.C., Mr. Greer, K.C., and Mr. C. G. Davies appeared for the plaintiff; and Mr. McCall, K.C., Mr. Profumo, and Mr. A. Leach appeared for the defendant.

The plaintiff was the daughter of a Nonconformist minister, and in September, 1907, was preparing to be a science teacher. She was working for the final examination for that career and found she was suffering considerable trouble with her eyes. The defendant was an optician carrying on business in Market-street, Manchester, and described himself as an eyesight specialist. The plaintiff called at his shop and asked for some spectacles that would improve her sight. She was seen by an assistant, who tested her eyes and supplied spectacles which he said would give her relief. The result was not entirely satisfactory, and the plaintiff returned to the shop from time to time.

In April, 1909, she was supplied with special glasses for reading, but as she still had trouble she eventually consulted an oculist. He found that she was suffering from conical cornea, and had evidently had the disease for several years, and her condition by then had become extremely serious. She was obliged to give up all hope of a career as a teacher, and was unfit for any occupation in which eyesight was required.

The plaintiff now contended that if the defendant and his assistants had exercised reasonable skill and care the existence of the disease could have

been easily discovered when she first went to the shop, and she might have been able to retard its progress ; and she brought this action accordingly to recover damages for negligence.

On the hearing being continued this morning the LORD CHIEF JUSTICE said that as he understood the position the fact of the plaintiff's condition was not seriously disputed, but there was a most grave question as to what the duty of an optician was in such a case.

His LORDSHIP then recalled Dr. Harman, who had given expert evidence on behalf of the plaintiff, and inquired whether there was any practical reason why, the trade of an optician being well known, an optician should not supply glasses if the eye responded to the tests described by the defendant. Dr. Harman replied that an eye might pass the tests perfectly and yet blindness or even grave brain disease might be impending. In his opinion, an optician should make it clear to his customer that he was only giving advice and supplying glasses to the best of his ability.

Arthur George Turner, called by Mr. McCALL, said he had been an assistant to the defendant about 12 years. In 1908 he did not test the plaintiff's eyes ; it was their invariable practice to make a note of tests in their books, and that being so he was satisfied he did not see the plaintiff at all.

The Defendant's Expert Evidence.

Mr. Sydney Stephenson, called by Mr. PROFUMO, said that for 20 years he had practised as a surgeon oculist, and was the author of works dealing with diseases of the eye. In conjunction with Dr. Wray, on behalf of the plaintiff, he examined the plaintiff in February, 1910, and found her suffering from conical cornea. She said she had been suffering from headaches and dizziness for some months and had worn glasses since 1907. He could not tell from his examination but from the history of the case he would say that when the plaintiff first went to the defendant in 1907 the disease would be in an incipient stage and would have existed for a few months.

Conical cornea was a very rare disease ; he would estimate it at one case in 10,000 of eye patients. In its incipient stage it was very difficult to discover, and no optician would be likely to detect it. The progress of the disease might have been slow from September, 1907, to April, 1909, and might then have been rapid. The glasses supplied by the defendant could not have increased the progress of the disease, and no glasses could have retarded it. There was no medical evidence to show that reading would make the disease worse, though he thought it might be unwise to allow reading.

Cross-examined by Sir F. LOW — In the condition in which the plaintiff's eyes were, it was important to avoid strain ; to endeavour to read with glasses that were too weak would cause strain. In 1907 the disease might have been discovered by an oculist. He could not say whether an optician could be appropriately described as an eyesight specialist.

Re-examined by Mr. McCALL.—To detect diseases of the eye required medical training.

Mr. G. Hartridge, called by Mr. McCALL, said that he was an F.R.C.S. and was consulting surgeon to the Westminster Eye Hospital. He considered that the spectacles supplied by the defendant were suitable in view of the tests taken.

Cross-examined by Sir F. LOW.—Congenital astigmatism and conical cornea could exist together. The duty of an optician must depend on what he held himself out as able to do in the particular case. In cases of conical cornea it was important that the glasses should be of sufficient strength.

Re-examined by Mr. McCALL.—There was no known treatment which would avail with conical cornea.

Further evidence* having been called the defendant's case was closed.

Mr. McCALL, addressing the jury, said that to succeed on the claim of negligence the plaintiff must show that the defendant had failed to do something which he had been employed to do, and had been negligent as an optician, not as an oculist. The medical men who had been called to prove negligence belonged to a profession which regarded an optician as an undesirable alien; no evidence had been given that the defendant had in any way failed in his duty as an optician, and that was the only standard to which he had to conform.

Sir F. Low replied.

Summing Up.

THE LORD CHIEF JUSTICE, in summing up, said that the case was one of difficulty both in law and fact.

The action was brought for a breach of duty by an optician, who carried on a well-known form of business; and if they thought he had been negligent as an optician they must find for the plaintiff. The plaintiff admitted that she had not been influenced by the defendant's description of himself as an eye-sight specialist, and she admitted that she knew an optician was not an oculist. Conical cornea was admittedly a very rare disease, and there was a conflict of evidence as to whether it could be easily discovered in its early stages. Could they say, in view of the fact that opticians carried on a well-known trade, that opticians were under any obligation to discover disease?

His Lordship then went through the facts of the case, and pointed out the inconsistencies in the plaintiff's story, and suggested that her memory was at fault. The jury to find in favour of the plaintiff must be satisfied that the defendant had been negligent as an optician or had taken on himself, and had not performed, duties outside those of an optician.

The jury retired to consider their verdict, and after an interval of 40 minutes returned a verdict for the plaintiff with damages £25. Judgment was entered for the plaintiff accordingly, with High Court costs.

Solicitors.—Lovell, Son, and Pitfield; J. Lee Smith, for Ogden Tyler. Manchester.

Times Law Reports, March 16th and 17th, 1911.

*Dr. W. J. M. Ettles also gave medical evidence in favour of the defendant.

TRANSLATION.

THE OPHTHALMO-DIAPHANOSCOPE AND ITS USE IN
THE DIFFERENT BRANCHES OF MEDICINE.*

BY

DR. CARL HERTZELL,
BERLIN, GERMANY.

IN number 24 of this paper (of this year) I wrote about a new method of examination, whereby it is possible, by means of a strong light thrown upon the back portion of a patient's oral cavity to get a direct view of the inside of the eye without the help of the ophthalmoscope.

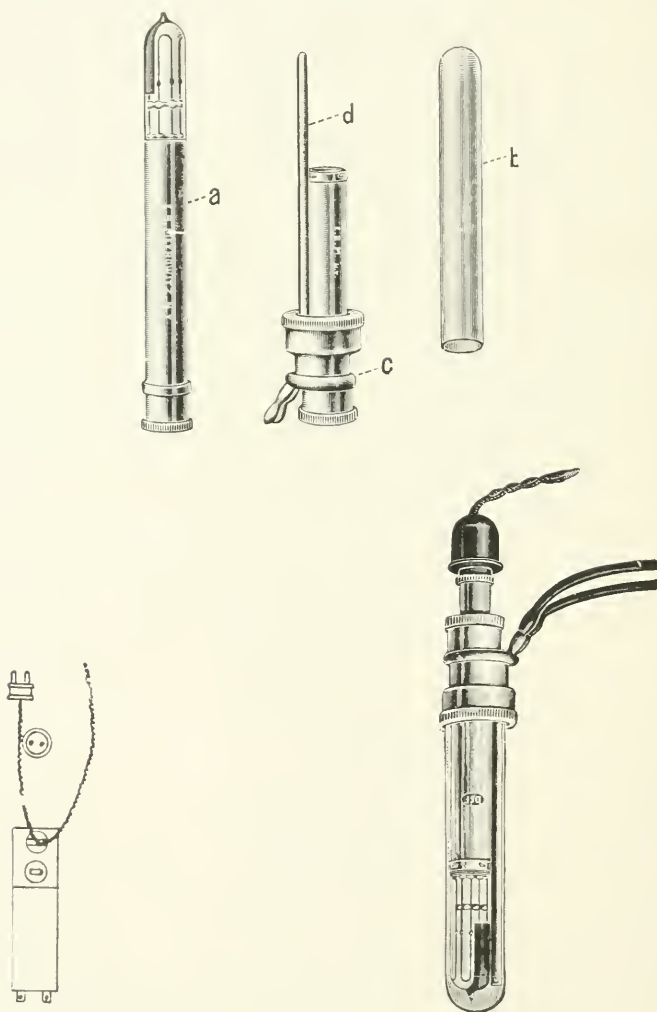


Fig. 1.

Since then it has been my task to perfect the apparatus used in the first experiments, and to give it a form suitable for practical use.

*Translated from the *Berliner klinische Wochenschrift*, 1908, No. 47.

As the strength of light of the apparatus is, on an average, more than ten times greater than that of any other instrument hitherto used for transillumination, and as the development of the heat and the strength of the necessary electric current is a particularly great one, there were at first many technical difficulties to overcome, which stood in the way of the construction of a convenient and trustworthy apparatus. It was especially necessary that the use of the water cooler should not be given up, as in using metal filament lamps it is impossible to get the necessary light of at least 80 candle-power without continuous water cooling. If the cooling were given up there would be at once a corresponding fall in the maximum light; therefore the cooling was kept up, but the arrangements for it were in such a form that they in nowise hindered the use of the instrument.

As will be seen from figure 1 of the diaphanoscope, the new type of metal filament lamp was used for the light, whereby it was possible to get with safety the necessary high current for the great lighting power. It is a long tube lamp with the filaments arranged in such a manner that the total light streams from one end of the lamp only. The outer glass case of the instrument is removable, and can be disinfected by boiling. As a rule, it is sufficient to disinfect it by dipping it in sublimate, or special outer glass cases of thin glass may be used for each patient examined. The lamps and the glass cases are interchangeable, and are easily inserted in the instrument by means of a screw and rubber washer. Water circulates between the two, and is introduced directly to the source of heat. It flows away through a second canule at the bottom of the apparatus.

The instrument described may now be provided in whatever way it is wished with the necessary electric current and cooling water (with the help of an irrigator arrangement if desired). As the consideration of the maximum light obtainable renders the use of the usual tension of 110 and 220 volts impossible, a rheostat should be used for regulating the current. A simple cooling arrangement, suitable for the instrument, and a rheostat, suitable for all voltages, can be obtained from the makers, or from Mr. E. B. Meyrowitz, 1A, Old Bond Street, London.

In order to make a complete arrangement (particularly for clinics, etc.) which would always be ready for use, and which could be readily worked by persons not quite accustomed to the instrument, the stand, as shown in Figure 2, was constructed.

This stand combines in itself the arrangements for connecting the apparatus with the water-cooler and the electric current, in conjunction with arrangements by which an absolutely safe working and comfortable handling of the apparatus are obtained. The water flows from the upper glass bell, through a tube in the stand to the reservoirs near the foot of the latter, and thus passes through the rubber pipes. The conduction of the electric current takes place through the connection of the back cord with the usual centre contact. The strength of the light is regulated by a rheostat, resistance coil of which is under the foot of the stand. A valve at the tap of the cooler provides that the apparatus can be used only if the water circulates through the cooling surface of the instrument.

If during the examination in the dark room the gradual depletion of the glass bell passes unnoticed (which will happen after about twenty minutes' use), the signal lamp on the stand will light automatically just before the water runs out completely, and thus the latter is again poured from the reservoir into the upper glass bell, so that the examination may be continued. The same lamp serves to light the dark room during the pauses in the examination. It is so connected that it lights automatically when the

apparatus is switched off, and goes out the moment the same is set in action again.

The lighting of the signal lamp, which announces the flow of the water, is worked by a specially constructed mechanism. A pull contact projects over the edge of the upper water container. By means of a wire a little float of the specific gravity of the water is attached, so that it is just over the bottom of the vessel. As long as this float is under the water, it is rendered weightless through the displacement of the water (as its specific gravity = 1). As soon, however, as the surface of the water sinks sufficiently to allow it to come above the surface, its weight comes in contact with the current, and lights the signal lamp.

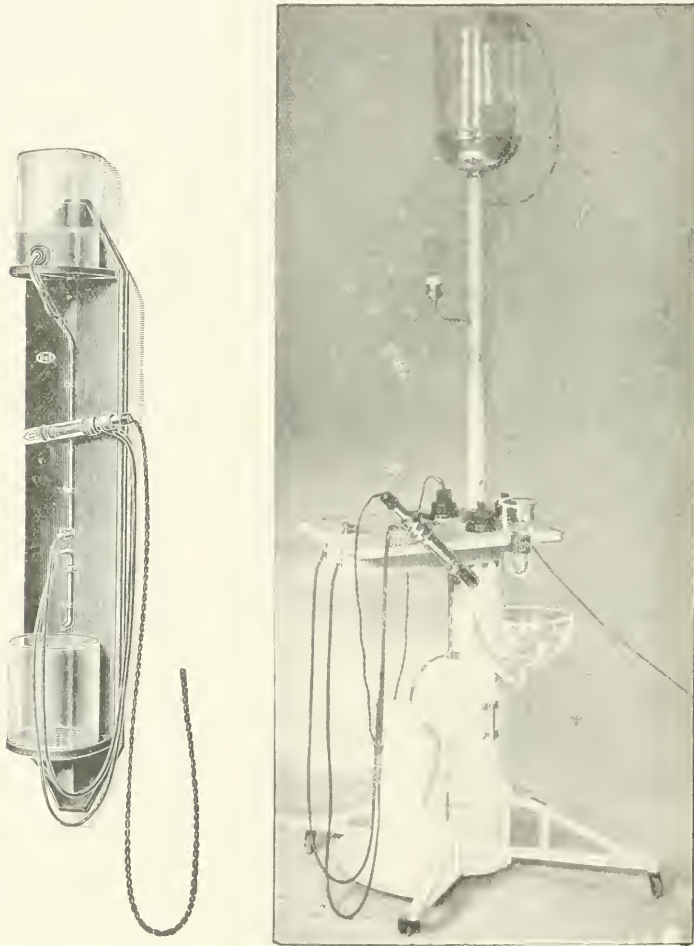


Fig. 2.

The connection of the apparatus with the support described ensures that it is always ready for use, and may be set in motion merely by turning the switch.

With regard to the character of the transilluminating method, I emphasised in my first paper the fact that the notion obtained thereby of the picture of the fundus of the eye was totally different from that obtained by the ophthalmoscope. In spite of this, I found that many were of the opinion that the

method did nothing but replace ophthalmoscopic examination. This has been so generally repeated that I take this opportunity of again exactly comparing the two methods :

In using the ophthalmoscope, the light is thrown through the pupil on to the background, and travels *reflected* by the latter to the eye of the observer. This method is therefore suitable for the recognition of *differences in colour* in the background of the eye.

On the contrary, in the transillumination method, the light starts at the pharynx and reaches the fundus oculi from the back, and travels *through* it to the observer. The fundus oculi is therefore between the source of light and the observer. The differences in colour are readily recognisable by this means, although, owing to the partial absorption of the rays, they are not visible with the same clearness as in the first method. The important thing which this method shows us, however, is none other than the transparency differences of the pathological changes observed. We see the fundus oculi, under exactly the same optical conditions as a microscopic preparation, or to be more emphatic, we *observe it as we are accustomed to observe organs (for instance, the wall of the intestine) and to examine their transparency, by holding them up against the light. This circumstance, that it is possible for the method to allow us to reach on living subjects a decision as to the transparency of the pathological changes in the fundus oculi, must be regarded as its nucleus.*

As it has not been possible to obtain any certain solution as to the question of this quality of changes by any of the known methods, this is unquestionably a new diagnostic triumph, which deserves to be used as a *completion* of the known methods for helping and widening our knowledge of the diseased fundus oculi.

The comparison allows us readily to understand the further characteristics of the transparency picture. If we observe an organ in an ordinary light, and then hold it against the light, the picture which it presents to us is totally different in the two cases. The same object which in the first place appeared almost white, can in certain circumstances of the transillumination of the organ, appear as a dark mass standing out from its surrounding, and *vice versa*. In spite of this, in many cases, both methods are suitable for explaining to us the pathological changes present. The position, size, and form of the changes are generally recognisable in a light which falls direct and in a transverse light. Thus, the ophthalmoscopic and transillumination methods may in many cases *replace* each other, although in general practice the transillumination method may with advantage be used in those cases in which the organs under observation differ from one another more by their transparency than by their colour. These include the cases in which one decides upon this method because of the very much easier *technique*, a larger surface of face, or the deficiency of the reflex (in macula observations). The *technique* is, in fact, so simple that even people who have never used the ophthalmoscope before, can at the first glance see the details of the upright picture and describe them correctly.

Practical experience will show us in which particular cases the transillumination method may be employed with advantage. To this end the ophthalmoscopic report should always be systematically compared with the result of the transillumination in a large number of pathological conditions. The setting out of the results arising therefrom cannot be the task of one man.

As a small contribution to this I will now describe once again the experiments which I have made with Dr. Durst in Professor Silex's clinic.

These experiments were conducted in a dark room, as shown in Figure 3. The patient himself holds the instrument as far back and as high up as possible in the mouth. A black mask protects the rest of the face from the rays of light, and the examiner approaches the lighted pupil as near as possible, and observes the transilluminated background of the eye without the



Fig. 3.

help of any other instrument. Only, in certain cases of ametropia a correction glass must be used. Practically, only cases of myopia come into the question.

In these experiments the circumstance must be taken into account that the possibility of obtaining a sufficiently large field of observation depends mostly upon the individual condition of the person under examination. Thus, it is important in how far the anatomical conditions (pigment of the fundus oculi, size of the cavity of the jaw, the blood value of the tissues, etc.) offer a greater or less hindrance to the passage of the rays of light. Whereas in one case, the pupils shine visibly at a great distance, in others the fundus oculi is only moderately illuminated. However, in all the cases I examined, I could easily discern the entrance of the optic nerve. The light obtainable, however, was in many cases insufficient to enable me to distinguish the details of the retina. The proportion in different places of favourable to unfavourable cases for transillumination must naturally vary greatly. The circumstances are, as a

rule, more favourable in those places where the blonde exceeds the dark type of complexion.

Further, the experiments proved that one was right in expecting the results from the method as described above. Everything in the fundus oculi which was in its transparency distinguished from its surroundings, was sharply defined. In this respect whatever does not change, or varies but little, disappears more or less.

As in the ophthalmoscopic so in the transillumination picture, the entrance of the optic nerve is the most clearly visible object in the normal fundus oculi. But contrary to the former, instead of being a sharply differentiated surface picture, it has a more opaque appearance, which is owing to the peculiar semi-transparent quality of the optic nerve substance. The colour in which it appears is therefore not only dependent upon the nature of its surface, but to a great extent likewise on the initial portion of the nervus opticus proper, and this is pathologically important. The outlines of the optic nerve disc are, as a rule, sharply defined. When a ring of pigment is present, it is seen very distinctly.

Next to the entrance-point of the optic nerve, the veins of the retina stand out most clearly from their illuminated surroundings, because their contents offer great resistance to the passage of light, which also makes them appear very dark. The arteries, since they contain lighter-coloured blood, are by comparison considerably paler. The macula lutea appeared as a dark spot in the cases which I examined.

Now, as bearing on pathological cases, and having regard to the above discussed phenomena of the normal fundus oculi, it was easy to foresee, *a priori*, that the data afforded by the new method would lead to definite conclusions. If the vessels of the normal fundus oculi were clearly perceptible, it must follow that the pathological variations in their calibre, etc., would likewise be distinguishable. If in the normal eye the limits of the papilla were sharply defined, it must be possible equally to discern any effacement of the boundary line between the papilla and its surroundings, caused by inflammatory modifications of the optic nerve. Further, one might reasonably expect that all diseases of the fundus oculi, characterized by abnormal pigmentation, would be easily diagnosed.

In a case of neuritis nervi optici the disease of the optic nerve was readily diagnosed. Similarly, in two cases of incipient atrophy of the optic nerve, the partial fading of the papilla was distinctly recognisable. The ease with which it was possible, without changing the illumination, to compare the healthy with the diseased side was particularly gratifying. Another case which, on the suggestion of a friend, I had the opportunity of demonstrating in the clinical hospital of Dr. Senator, clearly showed the ease with which it is possible to observe modifications in the region of the maculæ. This was a case of pernicious anæmia with blood effusion into the macula on both sides. Looking into the pupil it was quite easy to see, in their whole extent, the ecchymoses, which, dark and sharply defined, contrasted with the bright surroundings.

In order to ascertain how tumours affect the result of transillumination, the method was applied in a case where the clinical phenomena revealed the presence of a retrolubar tumour. It resulted that the healthy eye shone brightly and revealed the vessels of the fundus oculi, whereas the diseased eye was only faintly illuminated and details of its fundus could not be recognised.

Opacities of the lenses, etc., appear, in general, similarly as when employ-

ing the well known transillumination method with the aid of ophthalmoscope, but in the former case one is able to examine them binocularly, whereas when employing the other method only the eye armed with the mirror can observe the phenomena. A further advantage lies in the fact that the rays proceeding from the eye may be caught by any other instrument, with the aid of special optical appliances, and be utilized in any manner desired. For instance, there is no difficulty in employing a binocular lens in the course of transillumination.

As regards foreign bodies, I did not come across any cases, and was therefore restricted to making experiments on enucleated animal eyes and transilluminated animal tissues. I found that opaque, *e.g.*, metallic foreign bodies (copper splinters, etc.) are much more easily perceived by transillumination than by ordinary illumination. In the latter case the metal splinter (*e.g.*, copper) being a good reflector, contrasts but slightly with the likewise bright environment, whereas the same body when transilluminated, owing to its complete opacity, appears inky-black and sharply defined on a light background. Our method, being practicable in such a simple way and affording a large field of vision, offers the best chance of keeping the foreign bodies under observation while effecting their removal by means of a scleral incision.

With regard to recognising foreign bodies situated behind the posterior wall of the eyeball, we must notice the following particulars with reference to diaphanoscopy:—

One might expect that foreign bodies so situated would reveal their presence by a shadow when we look into the eye. In some degree this is indeed the case. But we must notice that only the smaller part of the rays employed succeed in piercing the semi-transparent tissue quite or nearly rectilinearly into the fundus oculi. The majority of the rays are reflected and scattered by the tissues in such a manner that from particle to particle the light is constantly dispersed. This, naturally, much impedes the production of a shadow, because no sooner is it produced, than it is diminished by the light which penetrates laterally. Light is propagated under these circumstances, in fact, just as it is when it passes through fog or some muddy liquid.

Although every kind of diaphanoscopy is subject to certain limitations, not to be got over, yet its results are by no means futile. Even in a fog we are able to recognise many things. The foregoing observations are only intended to show us in how far definite results may be expected from transillumination with regard to objects which are located in the tissue itself; and we see that small and opaque bodies, in order to be revealed by shadows, must lie close to the surface under examination, whereas extensive formations (tumours, etc.) are recognisable even at some distance from the surface observed, in proportion to their size.

The phenomena connected with the pupil are of very special interest. One could not at first foresee definitely how the pupils would react upon illumination of the fundus oculi from behind. Experience, based on the cases examined, has shown that at first strong contraction occurs, which, however, generally gives place to a maximum and permanent dilatation, which, by the way, very much facilitates observation of the fundus oculi. The observation of all reactions of the pupil is considerably facilitated by the circumstance that with this method the pupil appears in the dark room as a shining disc, the changes in whose size may be very easily observed. I have up to the present had no opportunity of making observations on pathological conditions of the pupil.

In conclusion, we must say a few words on the didactical importance of the transillumination method. The great difficulty in learning the art of

ophthalmoscopy consists especially in the fact that in order to attain his object, the observer is obliged, in the first place, to throw the light in a proper way into the eye to be examined, and, moreover, to place himself in such a position that a distinct image of the illuminated fundus oculi may be cast upon his own retina. These two conditions, depend upon quite a series of special circumstances. In order to see the fundus oculi distinctly, it is therefore necessary to fulfil a great number of conditions at one and the same time. Let only one of them be neglected, and the desired result is unattainable. Now when employing transillumination, the fundus oculi is illuminated to begin with, which at once does away with one series of the necessary conditions. The transillumination of the fundus oculi is therefore didactically a preliminary of ophthalmoscopy. When the student has learned how to place himself in order clearly to see the already illuminated fundus oculi, he may proceed to make the same experiment, while he himself illuminates the object of observation. In Professor Silex's ophthalmoscopic class, composed of twelve students, this manner of introduction to the practice of ophthalmoscopy was employed for the first time. Transillumination was applied in a suitable case, with the result that all the students, although they had had no previous experience of ophthalmoscopy, were able on their first attempt distinctly to perceive the details of the erect picture.

Summing up what has been said, then, I am of opinion that the method of transilluminating the fundus oculi is of an independent character, and its results should not be simply placed on a par with those of ordinary ophthalmoscopy. On the contrary, it is essentially distinct. The object of the method is to examine the fundus oculi with a view to discovering differences in transparency. Opaque portions appear sharply defined on the surface of the fundus oculi. Those which occur on the wall of the eyeball reveal themselves by a shadow proportionate to their size.

A secondary use of the method lies in the fact that, owing to the ease with which it can be applied, it may, within circumscribed limits, offer a substitute for the image presented by the ophthalmoscope, though it does not pretend to emulate the latter in detailed superficial indications.

The clinical and experimental researches as hitherto practised possess evident advantages, *e.g.*, in the detection of tumours, foreign bodies, certain forms of clouded lenses, in the observation of maculæ, and for didactic purposes.

Further results may be expected, especially from the supplementation of one method by the other.

Special researches have still to be undertaken with regard to pupillary reactions.

So much for the application of the apparatus in illuminating the fundus oculi from the mouth. This does not by any means exhaust the uses of the instrument. With the help of the cooling apparatus, it has been possible to employ an intensity of illumination surpassing many times anything which has been attempted previously, and experience has shown that the apparatus can be advantageously employed in the most various departments of medicine, *viz.*, wherever great intensity of illumination is desirable, whether for casting light upon or through the object or for therapeutic irradiation, when the instrument has also to be relatively small.

We may first mention some of these applications in ophthalmology :

At the same time as the instrument, a cylindrical metallic envelope (*a*) was constructed. This envelope is passed over the glass cover of the instrument, and at its upper end, where there is an opening for the passage of the light, it can be armed with various accessories (*b*, *c*, *d*) (Fig. 4).

When provided with a conical, light-gathering piece (*b*), like the glass cones mentioned by Sachs, Hirschberg, and others, the instrument can be employed in the same manner as the numerous other apparatus used for transillumination of the anterior and lateral walls of the eye, and the results are superior in proportion to the far greater illuminating power of the instrument. The cooling process favours this improvement in two ways. In the first place, it makes the employment of more powerful illumination possible; and, secondly, its utilisation is much better because the base of the cone can be brought immediately near the source of light.

To complete what has been said above as to the character of the trans-illumination of the fundus oculi, we will here consider the passage of the rays while employing these instruments for transilluminating

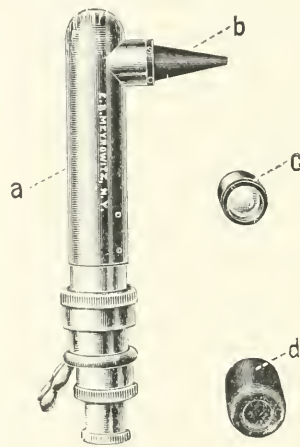


Fig. 4.

the eyeball from the front. If such an instrument is placed against the anterior or lateral wall of the globe, so as to obtain while looking into the pupil, a picture of the fundus oculi (*e.g.*, the macula or papilla) the rays first traverse the wall of the bulb, then reach the fundus oculi, and are reflected thence through the pupil, thus reaching the eye of the observer. The image of the fundus oculi thus obtained is therefore analogous to that obtained by the ophthalmoscope, with this difference that the light employed has lost part of its rays through absorption. In its passage through the wall of the eyeball it has become saturated with the colour of blood. It consists mainly of red rays, and is consequently no longer able to reveal as many shades of colour as the ophthalmoscopic image. When considering the outermost periphery of the retina its character may approach that of the transillumination image, with which it shares, moreover, a portion of the simpler *technique*.

If instead of the conical piece, we attach to the apparatus a collecting lens (*c*), we shall now be able to illuminate the anterior portions of the eye laterally, to investigate sluggish reactions of the pupil, etc.

In the treatment of the throat and nose, the instrument may be employed for illuminating the antra, especially with a view to ascertaining any obstacle to the passage of the rays through one of these two cavities, as

indicated by a difference in the light received by the two eyes. Similarly, with the piece (*d*) in connection with lens (*c*) for transilluminating the frontal cavities. The same object can be attained with the cone (*b*). With the envelope, and without other accessories, the instrument can be used for intense illumination of the pharynx or any other parts of the body.

We may mention, by the way, that when the instrument is placed in the mouth, as when the antra are to be illuminated, a great portion of the rays finds its way through the palate into the nasal cavity, and in this way the whole interior of the nose is rendered visible.

Very shortly after the appearance of my first publication, Professor Kroemer, of Berlin, mentioned various other very interesting uses of the apparatus in gynecological diagnosis and cystoscopy.

If the instrument is introduced into the vagina, and if at the same time the interior of the bladder is examined with the optical apparatus of the cystoscope, without putting into operation its illuminator, one easily sees the walls of the bladder in the bright light. The conditions are quite analogous to those obtaining when contemplating the fundus oculi, with this difference that the lens arrangement of the cystoscope is represented in the latter case by the natural lens.

All that was said with regard to the eye, on the difference between the illuminated object and the transilluminated image, applies equally to the bladder.

It still remains to carry out more extensive observations by means of this method, especially to ascertain in how far the advance of a carcinomatous tumour towards the wall of the bladder can be determined and consequently a prognosis can be made in view of operation.

It appears that in 1867 Bruck, of Breslau, proposed examination of the interior of the bladder by introducing an illuminator into the rectum. His proposal, however, was not taken up, perhaps because the light employed was too feeble to obtain conclusive results, but especially because instead of limiting the method to objects which are accessible to diaphanoscopy (tumours, etc.), it was generally regarded as a means of illuminating the interior of the bladder, an end which for reasons fully discussed above (red light) is gained much more perfectly by the cystoscope, which was invented shortly afterwards.

A second mode of application mentioned by Professor Kroemer has reference to the differential diagnosis between cystic and solid adnexal tumours. As cysts and solid tumours affect the passage of the rays in an opposite manner, the former gathering them like shoemaker's balls while the latter place an obstacle in their way, it was to be expected that this different behaviour would yield material for a differential diagnosis. Practical trials with this object fully justified the expectation. In the case of a palpable adnexal tumour of the size of a hen's egg, the instrument, being introduced into the vagina, was placed behind the tumour and at the same time the abdominal wall was inspected. While the abdominal walls generally were scarcely illuminated, there appeared in the place of the tumour a distinctly circumscribed shining region, which, on manual displacement of the tumour always followed its situation, a visible proof of the existence of a cyst. The solid body of the uterus was revealed by the effect of shadow.

In examining another case, where no tumour could be ascertained by palpation, the region above the symphysis was illuminated to a large extent. This phenomenon could only be connected with a full bladder acting in the same manner as a cystic tumour. The catheter was applied, and, in fact, the abdominal wall became perfectly dark when the urine was drawn off.

Finally, experiments which were made in order similarly to recognise initial pregnancy by the optical effect of the predominantly liquid contents of the uterus during the first months, remained without results, possibly because the cases examined were unsuitable, but more likely because the thick walls of the uterus, with their shadows, interfered with the cyst-like effect of the contents.

For introducing the instrument into the rectum for diagnostic photo-therapeutic objects one employs instead of the usual glass envelope another of a different shape and better suited for the purpose. (Figs. 5 and 6.)

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—THE INTRA-OCULAR CIRCULATION.

Weiss, Otto.—The intra-ocular circulation. (*Der intraokulare Flüssigkeitswechsel.*) *Zeitschrift für Augenheilkunde*, Januar, 1911.

Weiss, of Königsberg, in a carefully argued paper throws grave doubt upon the universally accepted theories of the intra-ocular circulation. He concludes that there is really no regular circulation of fluid from the ciliary body, through the pupil, and out again by Schlemm's canal. In fact, he argues that as the pressure in Schlemm's canal may be slightly higher than that within the eye, a reverse stream may exist for a time. A careful study of his paper will certainly shake the faith of those who have lightheartedly accepted the older views. Weiss practically says, with Henderson, that intraocular tension is that of the general venous tension. He does not allude to Henderson's work, and probably has not read his book; but he arrives at an identical result by a different route.

The author first points out that the orthodox view of a constant stream of lymph through the eye has no analogue in the human body. Such a phenomenon has not been established for the cerebro-spinal fluid, and is unthinkable in the case of the amniotic fluid. Direct observation of the eye lends no support whatever to the accepted view. Leber introduced finely divided gold leaf into the anterior chamber, but neither from the observation of these particles nor of cholesterine crystals in the aqueous could he detect the slightest evidence of a stream towards the periphery. No difference of hydrostatic potential can be detected between the various parts of the eye. Manometers connected with the vitreous chamber and the anterior chamber stand at the same level: Hess has definitely established this fact. In spite of this, we should be compelled to admit the existence of a constant stream, if it were once established that there is either a constant formation of new fluid in the eye or a constant flow from the eye. For it is obvious that the tension of the eye can only remain constant when secretion and excretion balance each other.

Let us first consider the arguments which speak for a constant formation of new aqueous. We are at once met with a divergence of views upon the

exact source of the fluid. Excluding isolated suggestions that the choroid may share in the process, we can say that in mammals the iris and ciliary body are held to be the source of the fluid. The older authors saw in the ciliary body the sole seat of the production of aqueous, and Mery and Beer, and, more recently, Leber, have tried by exhaustive research to prove this theory. Ehrlich suggested that the iris might participate, and Hamburger went even further, ascribing the chief rôle to the iris, and relegating the ciliary body to a wholly inferior position. Attention was first drawn to the ciliary body because after wounds of the cornea which resulted in loss of aqueous, a stream becomes apparent which flows from the pupil. This is clearly evident, if, before the paracentesis, the animal be injected with fluorescein. Arguing from this observation, authors have concluded that the same phenomena is present in the intact eye. The experiment makes it perfectly obvious that fluid can enter the eye behind the iris. We must, however, consider what power determines this entrance of fluid. In the experiment the aqueous had flowed out and the intra-ocular tension was non-existent.

It is manifest that under these conditions the pressure in the blood vessels exceeds that outside them, and so plasma will be forced out of them. This suggestion is upheld by the fact that the fluid transuded is not normal aqueous, but approaches plasma in constitution. The supporters of the theory that the ciliary body is constantly producing aqueous must give an explanation of the source of the force which causes the flow. The obvious course is to regard the process as a filtration, and this was the view held by the earliest authors. But difficulties soon appeared. They are especially manifest when we consider the alterations in the chemical constitution of the fluid with altered intra-ocular pressure and the high percentage of salt in the aqueous. The discovery that the aqueous contains more sodium chloride than the blood plasma is a great objection to the filtration theory. It becomes necessary to introduce secretion, a vital process, not a mere physical osmosis, for if the aqueous were a mere transudate it could never contain more salt than the plasma from which it transudes. We must remember that the anterior chamber is bounded by the cornea, which is constantly laved by tears rich in salt. The percentages are as follows: the blood serum contains 0·6 per cent. of sodium chloride, the aqueous 0·7 to 0·8 per cent., and the tears 1·3 per cent. We know, especially from Leber's work, that the cornea is permeable by diffusible substances, especially by salts. The concentration of the tears is really greater than 1·3 per cent., for fluid is constantly evaporating and concentrating the solution. We have here an explanation of the higher salt content of the aqueous than the blood plasma. Bottazzi and Sturchio have shown that the salt content of the fluids of the eye diminishes from before backwards. This discovery absolutely contradicts the view of a constant circulation of fluid. Did this obtain, the salt content would be uniform. Were there, however, a stagnation of the fluid, we should expect the salt content of the aqueous to be higher than that of the fluid further back in the eye.

Assuming for a moment that there is such a circulation. Then the fall in salt content from before backwards postulates a secretion rather than a transudation. There is, however, much against this theory. It is impossible to collect the secretion of the aqueous humour glands, for every alteration in pressure varies its constitution. Henderson and Lane Claypon have shown that there are no changes in the cells of the ciliary body comparable to those found between a resting and a secreting gland. Nor can the fact that *seclusio pupillæ* may be followed by hypertension be taken as an argument for continuous secretion of aqueous, for Stock has shown that complete adhesion

between lens capsule and iris can exist without any such rise of intra-ocular pressure. The glaucoma is most probably due to an inflammatory exudation.

The experiments of Leber, who occluded the pupil, and the observations of Uhlich upon a membrane in a hole in an abnormal iris do not prove continuous secretion. Hamburger's experiments speak volumes against such a state of affairs. He injected fluorescein into the posterior chamber, and found that it did *not* flow into the anterior chamber. Leber, Reinstein, and Weselly have repeated these experiments with a similar result. Leber substituted for fluorescein Indian ink, and again the result was negative: the fluid did not appear in the pupil.

We have already shown that there is no evidence that aqueous is constantly secreted by the ciliary body; these last experiments shew that such a constant production has no real existence. The supporters of the constant flow theory were forced, therefore, to seek another source for the aqueous. Hamburger fell back upon the anterior surface of the iris for the origin of the aqueous. Ehrlich observed the so-called "Ehrlich's line" on the iris of rabbits which had been injected with fluorescein. Schiech showed that if the iris be left horizontal the line does not appear, and Ehrental that the line could be produced by injection experiments on dead animals. Again, the line does not appear in all animals. Leber occluded the pupil and removed the cornea. He found that the iris remained dry, and, in consequence, concluded that it had no secretory function. These facts all tend to show that *there is no continuous secretion of fluid in the eye.*

The second question to consider is whether there is any proof that fluid is constantly flowing from the eye. The researches centre upon observations of Schwalbe, who discovered that in dead eyes colouring matter injected into the anterior chamber enters the veins of the sclera, passes into the ciliary veins, and, finally, reappears in the venæ vorticosæ. Leber and Nuel shewed that the same was true when emulsions of Indian ink and similar substances in a state of fine division followed the same path. No one has yet succeeded after injections into a living eye, in finding free grains of Indian ink in a blood vessel. The experiments do not prove that anything analagous happens in the living eye. All experiments made with dead eyes in which the tension is *zero*, have little in common with the conditions found in the living eye.

In order that the blood circulation may continue, the pressure in the blood vessels must be higher than that outside them, otherwise the capillaries would be compressed and stasis ensue. Even in the venæ vorticosæ there must be some excess of pressure over the outside pressure; therefore the pressure in these veins where they pass through the sclera must exceed the intra-ocular pressure. The pressure in Schlemm's canal must be higher than in the vorticose veins; therefore the pressure in Schlemm's canal is higher than that within the eye. Weiss, after discussing other observations, decides that there is no evidence that aqueous flows out by the orthodox channels *viâ* Schlemm's canal. He concludes that there is no *continuous* stream of aqueous from behind forwards.

The paper merits careful study, especially in the light of Henderson's views.

T. HARRISON BUTLER.

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II.—THE OPHTHALMO-DIAPHANOSCOPE.

- (1) **Langenhan.**—The clinical value of transillumination of the fundus from the pharynx with especial reference to the diaphanosopic diagnosis of intraocular tumours of the posterior portion of the globe. (Klinische Verwertung der Durchleuchtung des Augenhintergrundes vom Rachen her mit besonderer Berücksichtigung der diaphanoskopischen Diagnose intraocular Tumoren des hinteren Bulbusabschnittes.) *Berl. klin. Wochenschrift*, 13 Juni, 1910, and *Zeitschrift für Augenheilkunde*, August, 1910.
- (2) **Langenhan.**—Testing the transparence of the medullated nerve fibres of the retina during life by transillumination of the fundus. (Prüfung der Transparenz markhaltiger Nervenfasern der Netzhaut beim Lebenden mittels der Durchleuchtung des Augenhintergrundes.) *Zeitschrift für Augenheilkunde*, Dezember, 1910.

(1) There can be no reasonable doubt but that Hertzell's new pharyngeal lamp* will prove to be a most valuable instrument in the differential diagnosis between ablatio retinæ, tumours, and other defects at the posterior pole. The author points out how exceeding difficult it often is to decide whether a retina is detached by an exudate or by a neoplasm. The new method has enabled this to be done in a number of cases.

Langenhan, of Berlin, has made certain alterations in the instrument, to prevent light from being projected forwards towards the mouth. The lamp is a powerful electric bulb enclosed in a second tube which is water-cooled. A dark mask is placed over the patient's face, and the observation made through the dilated pupil by either the direct or indirect method. Any error of refraction is best corrected by placing the appropriate lenses in the trial frame. Opacities of the media do not form such a hindrance to diaphanoscopy as they do to ophthalmoscopy, but if they be too dense, the examination fails. Two beautifully colored plates accompany the paper, and clearly show the scope of the method. One is a detached retina, the other, a tumour seen both ophthalmoscopically and diaphanoscopically.

T. HARRISON BUTLER.

(2) **Langenhan** (Berlin).—Little is to be found in literature about medullated nerve fibres in the retina. Landois, in his new *Physiology*, states that when fresh, the medulla is homogeneous, highly refractive, shows positive biaxial double refraction, and has a fluid consistence, the fluid oozing from cut nerves in spherical drops. The optically active agent is lecithin. Ether, chloroform, and benzine, by dissolving the myelin substance, make such nerves more transparent. Ophthalmologists regard these fibres as only slightly transparent, for they cause enlargement of the blind spot and mask unlying structures. The scotoma is positive towards the centre of the blind spot, but is only relative peripherally. In many cases, however (some recorded by v. Michel) no enlargement of Marriott's spot has been detected. Nor is the presence of such a scotoma a proof of non-transparence of the fibres, for it may be associated with other defects in the retina. There is no record of a microscopical examination in a case where the scotometer has shown that the blind spot was enlarged.

The use of Hertzell's lamp has cleared up all doubts about the matter. Diaphanoscopy shows that these medullated nerve fibres are only slightly

*See p. 357 of the present number of THE OPHTHALMOSCOPE.

transparent and are seen as a shadow stretching from the opaque nerve head. The plate which accompanies the paper shows exactly what is seen. The upper figure shows the ophthalmoscopic and the lower the diaphanoscopic picture of the same fundus.

T. HARRISON BUTLER.

III.—CORNEAL MYCOSIS.

Morax.—Corneal mycosis caused by *Verticellium graphii*. (Mycose de la cornée causée par le *verticillium graphii*.) *Ann. d'Oculistique*, novembre, 1911.

Morax, of Paris, records the case of a man, aged 44, who complained of a feeling of weight in his right eye, which had lasted for five days, and of a white spot on the cornea, which had been noticed for three days before he sought advice. On examination, he was found to have photophobia, with very slight œdema of the free palpebral margin and a fairly dense circular whitish spot, 3 mm. in diameter, below the centre of the cornea. The edge of this area stained with fluorescein, and there was a 2 mm. hypopyon, but under atropine the pupil dilated fully. The corneal sensibility was unaltered, and there was no pain or adenopathy. On passing a platinum loop around the borders of the ulcer, it was found to be covered with a whitish mass, resembling a false membrane, which could be easily detached. Under treatment by cauterisation, atropine, and a bandage, the eye made an uninterrupted recovery.

Examination of smears from the substance removed from the surface of the ulcer showed that it consisted of felted valved filaments with polynuclear leucocytes between them. In cultures of the same material on ascites-agar a number of downy greyish colonies developed in 24 hours which were found to consist of valved mycelium with anastomosing prolongations frequently terminating in oval spores, 5 to 6 μ in diameter, while a large number of similar spores were found along the sides of the filaments. Cultures on various media gave the following appearances.—*Agar*—in 24 hours small greyish superficial tufts with deep brown vegetation below the surface. *Potato*,—colonies whitish at first changing through grey to brown, the centre becoming dark very rapidly. *Carrot*,—same characters as on potato which, on spreading, formed elevated rosettes with dark centres. *Serum*,—colonies remained whitish or grey longer than on other media. *Bouillon*,—small transparent balls formed in bottom of tube. *Milk*,—only slightly altered. *Gelatine*,—no liquefaction, colonies similar to those on agar. *Glucose-agar with tournesol red*, colonies surrounded by blue area. The growth of the fungus was considerably greater at 37° C. than at 28° C.—22° C.

Inoculations were made on seven rabbits, two guinea-pigs, and two mice. Intravenous inoculations in a rabbit produced no result. Subcutaneous inoculation in a mouse caused a local infiltration, which disappeared in a fortnight. Tattooing of the cornea of a rabbit with an emulsion of the spores caused a number of greyish infiltrations, from which cultures of the organism were obtained. Microscopic examination of this cornea shewed the presence of spores but no mycelium. A second rabbit tattooed in the same manner developed a white spot which was still present at the end of four months. A guinea-pig and a mouse tattooed in a similar manner showed no reaction. Intralamellar injection of spores in a rabbit was followed by

corneal infiltration, which cleared up, while similar injection in another rabbit, preceded by cauterisation of an area of the cornea, was followed by secondary infection with thick purulent exudation in the anterior chamber, which contained colonies of *Verticellium graphii*, in addition to the micrococcus which caused the infection. Inoculation of the anterior chamber in two rabbits caused, in three to four days, a fibrinous exudation with slight corneal haze. In one of these the exudate cleared up in ten days and in the other it was removed for examination and found to consist of fibrin and leucocytes containing some spores which in cultures produced characteristic colonies. The animal got perfectly well.

From this clinical and bacteriological investigation Morax concludes that there is a mycosis of the cornea caused by a fungus having the characters assigned by Harz and Bezold to *Verticellium graphii*, and he quotes cases recorded by Wicherkiewicz, Baquis and Cardon, and Bono which he believes to have been due to it, although they were attributed to other organisms. The author quotes a long note by M. Penoy of the Institut Pasteur on the organism isolated from his case, and concludes that there are other mycotic corneal infections besides that due to aspergillus, especially those produced by *Verticellium graphii*, which are characterised clinically by the pseudo-membranous nature of the corneal exudate containing the parasite, and that as his experiments show that this organism has only a relative pathogenic power, it is probable that some, at any rate, of the human tissues have a special receptivity for it.

R. J. COULTER.

IV.—TENONITIS.

Lurie, O. R.—Two cases of Tenonitis. (Zwei Fälle von Tenonitis.)
Centralbl. f. prak. Augenheilk., Oktober-November, 1910.

Lurie, of Kiew, Russia, has collected the literature of this subject, and adds two cases of his own, one of the more common form of serous Tenonitis, and one of the very rare suppurative form. The subject has been well treated by Birch-Hirschfeld in the new Graefe-Saemisch *Handbuch*, but cases of this interesting and rare affection are always worth recording.

Lurie's first case was in a man, aged 33 years, who came complaining of redness and slight watering of the right eye. He had been seen a year before for a chalazion, when his vision = 1.0. Now, vision of the right eye = 0.3, and there was a fine brick-red injection of the posterior conjunctival vessels. Intraocularly, everything was normal, and externally the movements were good and painless, and there was no protrusion of the globe. No history of any infective disease could be obtained, but the patient was much subject to eczema. No definite diagnosis could be made at the time, and the patient was treated with yellow oxide of mercury. The conjunctival redness gradually spread, and two weeks later, a slight, pale-yellow chemosis made its appearance in the lower portion of the eyeball, together with slight steaminess of the upper part of the cornea. The fundus was normal, but vision had sunk to 0.2. Movements good. No pain; no diplopia could be elicited. The chemosis gradually increased and became converted into a pale-yellow swelling, and now the diagnosis of Tenonitis was made but without being able to find any cause. After three months and a half, the condition began slowly to improve, and at the end of the fifth month was entirely cured but for a yellowish discolouration of the sclera. About six

weeks later, the patient suddenly began to lose his hair and to develop other signs of a recent syphilis, and thus the cause of the affection was established.

The second case was that of a doctor who came complaining of cedema of the upper lid and unpleasant sensations in the left eye, some pain on the left side of his forehead, headache, and sleeplessness. The patient had had during the preceding week a moderately severe attack of influenza. Objectively, the tarsal portion of the upper lid was swollen, and the tarsal conjunctiva hyperæmic. There was slight protrusion of the eyeball, and movements of the eye caused him great pain. Diplopia could be elicited on looking to the right. V.=10. Cornea, anterior chamber, and iris normal. In the lower portion of the choroid there was a pale-yellow circumscribed exudate, $1\frac{1}{2}$ P.D. in diameter, with the retinal vessels running over it; otherwise everything was normal.

The next day the choroidal exudate reached the disc, there was increased exophthalmos and headache, and in the lower portion of the bulbar conjunctiva a yellow-red chemosis appeared. Temperature= 37.6° C. During the next days the temperature went up to 38.6° C. and the pain became very great. The media became opaque. T.+2, pupil small, and exophthalmos increased. The eye was quite blind.

At the end of a week, the condition became typical of panophthalmitis, and a fortnight later, a small yellow spot appeared in the region of the insertion of external rectus from which much pus and necrotic tissue came; when immediately the temperature fell, the pain disappeared, and the general condition improved. The discharge of pus lasted for about a week, and then the eye began to shrink, ending in phthisis bulbi, with a deep furrow, which represented a contracted scar on the outer side of the eye.

Whether the affection in this case began in the choroid or in the capsule of Tenon is, in view of the free communication between these two, impossible to determine; but the severity of the case was probably due to the fact that the pus collected in both situations simultaneously. It further shows the necessity of a very guarded prognosis, as this case began in a very mild manner and ended so disastrously.

A. LEVY.

V.—LYMPHORRHAGIA OF THE FUNDUS OCULI.

- (1) Purtscher.—A unique condition following traumatism of the skull. (Noch unbekannte Befunde nach Schädeltrauma.) *Bericht der Ophthalmologischen Gesellschaft, Heidelberg, 1910.*
- (2) Koerber, D.—Lymphorrhagia in the fundus after fractures of the skull. (Lymphorrhagie im Fundus bei Schädelbruch.) *Centralbl. f. prak. Augenheilk.,* Dezember, 1910.

(1) Purtscher, of Klagensfurt, describes a fundus condition following traumatism of the skull which appears to be, if not quite unique, at least exceedingly rare. The ophthalmoscopical appearances are shown by two coloured drawings of the posterior poles of the eyes in question.

The patient fell from a height of about thirteen feet upon his head, and for a time remained unconscious. He suffered neither from great headache nor from vomiting. There was hæmorrhage from neither nose, mouth, nor ear. Since the fall, the patient has seen badly, especially at night. Fourteen days after the accident, he was examined by Purtscher who found R.V. = 6/30, L.V. = 6/20, not improved by glasses. The ophthalmoscopic

picture was dominated by shining, dazzlingly-white patches, and on the right side by hæmorrhages. Both discs were normal, with sharply-defined edges. Vessels of normal calibre. These changes were chiefly found between macula and papilla, but extended along the vessels for 3-6 disc diameters towards the periphery. The patches were definitely associated with the veins, the arteries being perfectly normal. On the right side there was a large præretinal venous hæmorrhage springing from, and bounded on one side by, the vena temporalis superior. Hæmorrhages were also seen in other situations. There were on the right side twenty-nine white patches, some as large as the papilla, others smaller. In places they veiled the veins, with which they were intimately associated. These were therefore situated in the innermost layer of the retina. These white areas suggested large snow flakes. On the left side there were twenty-three white patches of more uniform size than those on the right, about half the size of the papilla. Only a small hæmorrhage was visible on this side. Both maculæ showed a gross stripping of a dirty-brown hue. There was no fovea reflex. Light perception was somewhat reduced. Neither albumin nor sugar was detected in the urine. Eight days later V.R. and L. with *plus* 0.75=6/12. The white spots showed rapid retrogression, and four days later, they were still less marked. Four months later V.R. and L. (corrected) =6/10. The fundus showed no changes such as are usual in old albuminuric retinitis. Foveal region stripped as before. The pigment epithelium universally finely stippled. Below the fovea was a short, and between it and the papilla a long, brown streak, perhaps representing a cicatrized atypical rupture of the choroid.

The author suggests the term *Angiopathia traumatica retinæ* for this condition, and compares it with another case which he saw several years ago. The patient had fallen from a roof and had symptoms of a fractured base. Three weeks later, he had a left amaurosis caused by optic atrophy, and on the right side a condition strictly comparable with the left eye of the present case. The only similar case was described by Liebreicht. Purtscher believes that lesions of the lymph vessels are primarily responsible for the appearances presented by this case. This is rendered probable by the intimate association of the patches with the veins, which, as Leber has shown, are surrounded by a perivascular lymph space. Geheimrath R. Leber has recently demonstrated that the intervaginal space of the optic nerve is connected with the subarachnoid space, and, further, with the cerebral ventricles, so that the possibility of the passage of cerebro-spinal fluid through the intervaginal space forwards into the retina must be considered. Leber further states that the vaginal space is, it is true, closed in front, but that injection proves that there is a connection, by means of the *lymph sheaths of the central vessels*, between it and Tenon's space, and even with the *perichoroideal space*. There is, therefore, the further possibility that under certain circumstances *liquor cerebro-spinalis* can force its way into the *perivascular lymph spaces of the retina* and into the perichoroideal space and give rise to changes in the retina. Further, Albert and Schrittzler have shown that artificial rise of intra-cerebral pressure can cause a constant, if slight, flow of cerebro-spinal fluid from the sheath of the optic nerve. It is possible that this may happen during the enormous rise of pressure caused by a fall. The white patches must therefore be regarded as due to a *lymphorrhagia*.

T. HARRISON BUTLER.

(2) The following case by **Koerber**, of Marxloh, belongs to that rare group (only five reported) which Purtscher described at the Ophthalmological Congress of Heidelberg, 1910 (*see abstract above*).

The patient, a miner, aged 18 years, on the 23rd November, 1907, had a

severe fracture of the skull, and on the 29th November was examined ophthalmoscopically, as he complained of bad vision in the left eye. Near the disc were found several large white masses and many smaller ones. These masses were more or less joined to each other, sharply circumscribed, and followed the course of the vessels, which were occasionally obscured. The larger vessels varied in calibre and quantity of blood they contained. There were no hæmorrhages. The condition improved rapidly, so that by the 19th December, the situation of the larger masses was differentiated only by a fine grayish stippling, while the smaller masses had disappeared without leaving any trace behind.

The diagnosis was difficult, but in the certificate for insurance purposes, Koerber certified the case as "probably" an extravasation of lymph from the lymphatics accompanying the vessels.

A. LEVY.

VI.—SPRING CATARRH.

- (1) **Blaauw, E.**—Spring catarrh. (Conjunctivitis vernalis.) *Zeitschrift für Augenheilkunde*, Oktober, 1909.
- (2) **Trantas.**—On spring catarrh. (Sur le catarrh printanier.) *Archives d'Ophthalmologie*, octobre, 1910.

(1) **Blaauw**, of Buffalo, N.Y., points out that in addition to the two forms of vernal catarrh described by Fuchs—one of which is characterized chiefly by growths on the tarsal conjunctiva, and the other by alterations at the limbus—there is a third variety in which the limbus is unaffected. It is very like the papillary form of trachoma, but is distinguished by the presence of a milky exudate and the presence of a large number of eosinophil cells. The author discusses the probability of the presence or absence of the so-called "trachoma corpuscles" as assisting the differential diagnosis. T. HARRISON BUTLER.

(2) In the past three years **Trantas**, of Constantinople, has observed sixty-eight cases of spring catarrh amongst 8,730 new patients; these added to 117 previously reported (for abstract see THE OPHTHALMOSCOPE, Vol. IV, p. 295) give a total of 185 cases in 25,400 patients, a percentage of nearly 0.78. This is rather higher than for preceding years, notably in 1909 (a very hot summer in Constantinople) when it reached 0.93 per cent. As previously observed, the occurrence of the disease is greater amongst the better than the poorer classes.

Of the sixty-eight recent cases, fifty-eight were in males and ten in females. Thirteen were less than ten years of age (one infant of 11 months), thirty were between 10 and 20, eighteen between 20 and 30, and four older, the oldest being 42. The majority of the cases was seen between May and August. As to type, twelve were of the palpebral, thirty-one limbal, and twenty-two of the mixed type. In two cases vegetations were noted on the lower lid, and in two others ovoid *plaques*, similar to those previously recorded, were present situated at 5 cm. to 1 cm. from the cornea and were of the same colour as the limbal excrescences.

With regard to the "white spots" (*points blancs*) to which the author has previously drawn attention, these were present in thirty-four of the cases, or 50 per cent., as against 11 per cent. of the earlier series, the increase being due, in his opinion, to more minute examination. Ten of these were of the mixed form, twenty-three of the limbal, and one alone of the palpebral.

The seat of election of the "white points" is the superior and supero-external portion of the eye, either at the limbus, scattered over the conjunctiva or, more commonly, on the limbal growths themselves. They occur at any period of the disease, but generally after the first year of its appearance, and vary in colour from grey or greyish-white to yellow according to age; round, sometimes ovoid, they are always of regular outline and appear to lie embedded in the limbal growth and are never raised above the level of the conjunctiva.

A "point" rarely lasts a week, usually it is "here to-day and gone tomorrow," others springing up in different situations in the same eye. The microscopic examination of three such cases confirmed the opinion already formed as to their histology, namely, that "they are due to degeneration of epithelial processes, producing cystic cavities."

Trantas considers these "white points" to be of practical value for diagnosis, by reason of their great frequency and their appearance in the early stages of the disease.

Contrary to the generally accepted opinion as to the rarity of corneal alterations in spring catarrh, the author has, by means of careful and minute examination, aided by fluorescein, been able to satisfy himself that such changes are by no means uncommon; for 31 of the 68 cases showed some alteration in the cornea, apart from those in which extension of the limbal growths to the cornea occurred.

These corneal lesions comprised: (1) simple superficial lesions of the epithelium made apparent only by staining with fluorescein; (2) "dust-like" opacity of the surface; (3) isolated parenchymatous opacities; (4) aggregated parenchymatous opacities forming "deep keratitis punctata"; and (5) a total opacity of the cornea described as "total sclerosing keratitis."

Simple superficial lesions, 9 cases in 60, 4 of which showed, in addition, the second variety, *i.e.*, "dust-like" opacity, and one other accompanied by two small parenchymatous opacities.

Dust-like opacities, 13 out of 68, sometimes in one eye, sometimes in both, and always more marked in the upper half of the cornea. Photophobia always more intense in these. One case, examined microscopically, showed that the lesion was due to "an alteration in the most superficial layers of the corneal epithelium."

Isolated parenchymatous opacities; 17 cases of the 68 presented this form. Some were accompanied by a general "dust-like" opacity in addition, and these should, in Trantas' opinion, be regarded as a more accentuated condition of the latter variety.

The more true type of parenchymatous *tache* is one in which the opacities last for months; as long, in fact, as the general irritation is present. The cornea presents isolated greyish opacities situated in its deeper layers and more frequently peripherally, though sometimes centrally, in size a millimetre or less, single or multiple, and never staining with fluorescein. Of the 17 cases shewing parenchymatous opacities, 10 were of the limbal type, 5 mixed, and 1 palpebral.

Five cases of the "*deep keratitis punctata*" type were seen, the condition being apparently due to the massing together of parenchymatous *taches*.

One case presented "*total sclerosing keratitis*" BERNARD CRIDLAND.

VII.—AN UNDESCRIBED TYPE OF ORBITAL INFLAMMATION.

Golovine.—Progressive inflammatory sclerosis of the orbit (an undescribed type of orbital inflammation). [*Sclerosis orbitæ inflammatoria progressiva* (type non décrit de l'inflammation de l'orbite).] *Ann. d'Oculistique*, mars, 1910.

Golovine, of Odessa, has had under his care for six years a patient suffering from a severe progressive affection of the orbits, the clinical and pathological features of which appear to him so distinct as to constitute it a definite disease with the following characteristics.—1. Periodic attacks of very painful inflammatory œdema in the orbital region. 2. Proptosis, at first occurring only during the attacks of œdema, but later remaining permanently. 3. Progressive diminution of the motility of the eyes.

As the case progressed further symptoms developed, some of which appear paradoxical. In spite of the œdema, the patient was unable to close the eyelids completely (the proptosis was not sufficient to account for this symptom). The orbito-palpebral groove, instead of being obliterated, was accentuated, giving rise to an appearance as if the upper eyelid was pulled backwards into the orbit. The cornea became insensitive, in consequence of which, and the lagophthalmos, ulcers developed on it. Ophthalmoscopically, the discs were a little pale, the arteries narrowed and the veins enlarged, but there was no trace of œdema.

Ultimately, after remaining localised in the orbits for years, the affection showed a tendency to become generalised. The liver and spleen became enlarged, the urine contained traces of albumin with erythrocytes and leucocytes, and the patient suffered from cardiac and general weakness.

An exploratory operation (the author's modification of Krönlein's operation) was performed four years after the commencement of the disease and one year after the patient came under Golovine's care, when the following conditions were found: 1. a whitish tumour the size of a hazel-nut feebly adherent to the lower wall of the orbit. 2. Several silvery-white bands uniting the tumour to the ocular muscles. 3. A tendinous looking band running back from the tumour and becoming fixed to the sheath of the optic nerve. 4. Indurated fibres in other parts of the orbit, resembling tendons and losing themselves in the fatty orbital tissue. The tumour was removed, some of the isolated bands were excised, and the wound was closed. The operation was followed by permanent diminution of the proptosis, with temporary improvement of the attacks of pain and œdema, and the patient was pleased with the result. Microscopic examination of the excised tumour showed that it consisted of compact connective tissue with interspersed layers of fatty tissue. The connective tissue was of a hyaline nature, with numerous, long, thin nuclei, and contained many mono- and poly-nuclear leucocytes, scattered or collected in groups, especially round the vessels, and a large number of mast cells. The fatty tissue also contained leucocytes and mast cells. Throughout the entire section there were numerous blood vessels, some of which shewed signs of endarteritis obliterans. In some places there were signs of degeneration in the connective tissue surrounding the vessels, and there were some hæmorrhages between the fibres.

At various times the patient had thorough treatment with mercury, iodides, quinine, continuous current, sweating, saline baths, mud baths, fibrolysin, and diphtheritic antitoxin ("paraspecific serum-therapy"), none of which produced any improvement.

The author refers to the extremely rare cases of acute relapsing œdema of the orbit recorded by Grun, Adler, Fuchs, Teillais, and Hübotter, and collected by Birch-Hirschfeld in his article on Diseases of the Orbit in the Graefe-Saemisch *Handbuch*, and points out that they differ from his case, inasmuch as there is no mention in any of them of changes persisting in the intervals between the attacks. He discusses the relationship suggested by Valobra to exist between Quincke's disease (circumscribed œdema), trophoneurosis, and elephantiasis, and the question as to whether the lesions found in his case can be explained on similar lines, but comes to the conclusion that his patient suffered from an affection *sui generis*, caused by an infective principle and having analogies with relapsing erysipelas, which can best be described as "progressive inflammatory sclerosis of the orbit," or "sclerosing cellulitis of the orbit."

By the way, Golovine's modification of Krönlein's operation consists in: (1) --A fork-shaped incision with the branches along the upper and lower orbital margins, and meeting outside the external canthus. (2)—Freeing of the external border of the orbit with section of the external ligament and the tarso-orbital fascia, followed by digital exploration of the orbit. (3)—If deemed advisable, resection of the external wall of the orbit, without previous separation of the periosteum.*

R. J. COULTER.

VIII.—REMEDIES.

- (1) Marquez, Prof.—The treatment of silver opacities of the cornea by means of sodium hyposulphite. *Eleventh International Congress of Ophthalmology*, 7th to 9th April, 1909.
- (2) Arroyo, Doctoresse (Madame Marquez).—On the preferential employment of atropine in corneal ulcers. *Eleventh International Congress of Ophthalmology*, 7th to 9th April, 1909.
- (3) Claiborne, J. H.—A case of gonorrhœal conjunctivitis in an adult aborted by two per cent. nitrate of silver. *American Medicine*, August, 1910.
- (4) Emerson, Linn.—Homatropin: A plea for its more frequent use. *Ophthalmic Record*, September, 1910.
- (5) Ohlemann, M.—Miners' nystagmus and formic acid. *Ophthalmic Review*, November, 1910.
- (6) Marzorati, F.—The employment of picric acid in eye work. (Sur l'emploi de l'acide picrique en ophtalmologie.) *La Clinique* (Bruxelles), 3 décembre, 1910.
- (7) Mansilla, Garcia.—Uranate of ammonium: A new drug for the treatment of ocular syphilis. (Nuevo tratamiento de la sífilis ocular por medio del uranato amonico.) *Arch. de Oftal. Hisp.-Amer.*, Enero, 1911.

* For abstract, see THE OPHTHALMOSCOPE, Vol. VIII, 1910, p. 378.

- (8) Knapp, Paul.—On the use of resorcin in the treatment of chronic conjunctivitis. (Ueber die Verwendung von Resorcin bei der Behandlung der chronischen Konjunktivitis.) *Klin. Monatsbl. f. Augenheilkunde*, Januar, 1911.
- (9) Verrey, Arnold E.—Ocular tuberculosis and Marmorek's anti-tuberculous serum. (Tuberculose oculaire et sérum anti-tuberculeux du Docteur Marmorek.) *Archives d'Ophthalmologie*, janvier, 1911.
- (10) Derby, George S.—Vaccine and serum therapy in ocular tuberculosis. *Ophthalmology*, January, 1911.
- (11) Schindler, O.—On the treatment of xanthelasma with radium. (Ueber die Behandlung des Xanthelasma mit Radium.) *Zeitschrift für Augenheilkunde*, Januar, 1911.
- (12) Eloui, Pacha.—A word on the treatment of ophthalmias with false membranes, the so-called diphtheritic conjunctivites. *Revue Générale d'Ophthalmologie*, 31 janvier, 1911.
- (13) Smith, Eustace.—A case of acute failure of sight treated with oil of turpentine. *British Medical Journal*, January 14th, 1911.
- (14) Allan, John.—Infusion of jequirity in ocular practice. *The Prescriber*, March, 1911.
- (15) Fromaget, Camille.—A dressing of iodoform for tuberculous dacryocystitis after operation. (Le plombage iodoformé pansement des dacryocystites tuberculeuses opérées.) *L'Ophthalmologie Provinciale*, mars, 1911.

(1) The treatment by means of sodium hyposulphite of corneal opacities which have been produced by silver nitrate, was suggested to **Marquez** by a case of trachoma which had been too energetically treated by silver applications in the hands of another surgeon. The author has no doubt that the cocain introduced in large amount, in order to permit of such energetic cauterization of the trachomatous palpebral conjunctiva, had been mainly responsible for the silver getting down to the substantia propria of the cornea, and, profiting by this idea and by the well-known solubility of silver chloride in sodium hyposulphite, he first softened the epithelium with a solution of 10 per cent. hydrochloride of cocain followed by slight *grattage* of the surface, and then made free applications, of a warm 5 per cent. solution of the hyposulphite. On account of the large extent of surface deprived of epithelium in this procedure, the patient complained of pain for a couple of days. Each day after the regeneration of the epithelium, the patient bathed the eyes with a warm solution of the hyposulphite for ten minutes, the bathing being preceded by the application of cocain. In about two months the opacity had almost entirely disappeared from the eye which had been thus treated, while in the other eye, which had been left untreated, the opacity remained as bad as ever. This second eye was then taken in hand, and eventually obtained V.A.=1, with the astigmatism corrected. The first eye did not give such a good result as the second, the author suggests because his *grattage* had been a little too free, with consequent formation of a tiny speck of cicatricial tissue in the centre of the surface layers of the corneal parenchyma.

ERNEST THOMSON.

(2) **Arroyo (Madame Marquez)**, of Madrid, reduces the criteria for the employment of mydriatics and myotics in the treatment of corneal ulceration to three, and proceeds to argue in favour of atropine in all three possibilities.

The three *criteria* are (1) the possibility of the appearance of iridic complications. (2) The tendency to perforation. (3) The central or peripheral situation of the ulcer. With the views of the authoress the reviewer, as a strong upholder of atropin in such circumstances, is in entire agreement.

It will suffice to quote Arroyo's conclusions, slightly abbreviated :

1. In *superficial* ulcers of the cornea, besides being a local sedative and antispasmodic, atropine prevents hyperæmia and inflammation of the iris, which may be a complication.

2. In ulcers which are *deep* and *central*, the indication for atropine is equally indisputable, in order to avoid incarceration of the iris in case of perforation.

3. In ulcers which are *deep* and *peripheral*, in which, at first sight, eserine might seem to be preferable in order to avoid or diminish incarceration, atropine is still indicated in most of the cases, because :

(a) When there is accompanying iritis, incarceration or anterior synechiæ are preferable to pupillary exudates and posterior synechiæ, which would be produced without atropine, and the formation of which would be favoured by eserine.

(b) The tendency to hernia of the iris favoured by the position of the perforation and by the hypertonic action of atropine can be neutralised by means of a well-placed pressure bandage.

(c) Eserine should be used only in cases where it is certain that there is no iritis, if, for other reasons, it is indicated.

ERNEST THOMSON.

(3) **Claiborne**, of New York, saw an early case of gonococcal conjunctivitis which he at once treated by a copious instillation of 2 per cent. solution of nitrate of silver. The second eye was protected by a Buller's shield. The original eye was well in five days. Atropine and *lavage* with perchloride of mercury, 1-3,000, were also employed. The same evening as that upon which the patient was first seen, the second eye showed signs of infection. The patient himself asked for silver nitrate to be used, but Claiborne allowed the disease to become thoroughly established before he used the drug, for several reasons, none of which appear valid. One was that he wished to satisfy himself that he could abort a well established inflammation ! The treatment of the second eye is open to criticism. Apparently, no bacteriological examination of its secretion was made initial signs of infection were neglected, and no prophylactic use of a silver salt was made. We are unable to agree with the author that gonococcal conjunctivitis in an adult almost invariably ends in permanent damage to the eye. It is, indeed, a dangerous condition, but not nearly so hopeless as Claiborne would have us believe. Nor is there any warrant for the statement that silver nitrate is incomparably more efficient as a germicidal agent than protargol, although we agree with him that it is superior to argyrol.

T. HARRISON BUTLER.

(4) In view of the varying opinions as to the efficacy of homatropin as a cycloplegic, **Emerson**, of Orange, N.Y., has carefully compared the effects of homatropin and atropin in a series of forty cases. He tabulates the results as follows :—

The ages of the patients were :—

5 to 10 years...	...	...	...	...	7
10 to 15 years...	...	...	...	...	20
15 to 20 years...	...	...	...	...	3
20 to 25 years...	...	...	...	...	3
25 to 30 years...	...	...	...	...	7
					—
					40
					—

The comparative results were :—

Refraction same under atropin and homatropin	...	22
+ '25 D.S. more under atropin in one eye	...	6
+ '25 D.S. more under atropin in both eyes	...	7
+ '50 D.S. more under atropin in both eyes	...	2
+ '25 D.S. less under atropin in both eyes	...	2
+ '25 D.cyl. more under atropin in one eye	...	1
		—
		40
		==

In but one case was a difference in the cylindrical correction required ; of forty cases, thirty-seven showed no greater variation than + '25 D. spherical. The writer used a solution of homatropin hydrobromide (Merck's), 2 per cent., and cocaine hydrochloride, 1 per cent., instilled every ten minutes for an hour before examination of the patient. He believes, with de Schweinitz and others, that if this method of cumulative instillation is adopted, the cycloplegic action of homatropin is quite trustworthy.

J. JAMESON EVANS.

(5) Percival* has been giving formic acid (25 per cent. solution, min. 5 increased to min. 10 after a week, thrice daily) in this condition. One miner reported himself cured in six weeks, although he had continued to work underground ; another, after 18 months' affection, showed nystagmus only on looking up after three weeks' treatment. **Ohlemann**, of Wiesbaden, is of opinion that no drug is of value. He tried formic acid in twelve cases without any result of permanent character, slight improvement being lost on return to work, and, therefore, probably being due to rest. A. H. PAYAN DAWNAV.

(6) The results obtained by Fortunati with picric acid in burns of the eye by lime have led **Marzorati**, of Brussels, to employ that remedy in all kinds of burns of the eye. He has in this way treated 21 cases, including burns by lime, sulphuric acid, caustic potash, hydrochloric acid, hydrofluoric acid, hot air, gas, metal in a state of fusion, and dynamite. After the eye had been carefully freed from the caustic agent, a 2 *per mille* solution of picric acid was instilled, and the parts were covered with a dressing. Slight cases speedily healed, but the evolution of more severe ones did not appear to be appreciably influenced by the picric acid.

SYDNEY STEPHENSON.

(7) **Mansilla** has used ammonium uranate in the treatment of syphilitic iritis and optic neuritis, with good results. He gives it by injection into the thigh, behind the great trochanter. The form in which the drug is used is a 5 per cent. solution in oil of vaseline ; 1 gram is injected.

HAROLD GRIMSDALE.

(8) A change of drug in the treatment of chronic conjunctivitis being often required, **Knapp** recommends, as an addition to the usual list of remedies, a 2 to 3 per cent. solution of resorcin, to be instilled two to three times daily. These drops cause considerable pain, which, however, lasts only three to four seconds. (The reviewer, who tried the effect on his own eye, is afraid that the intense pain will militate against the wide use of the drug.) C. MARKUS.

(9) **Arnold Verrey** describes at some length a case of tuberculous interstitial keratitis treated successfully by Marmorek's serum, and gives a review of the literature on this particular form of the antidote. The serum is obtained from the horse after immunisation for 1 to 1½ years by repeated injections of "tuberculo-vaccine," which, according to Marmorek, is the actual tuberculous toxin attacking the human organism. The toxin is obtained from culture of the "*primitiv-bazillus*" in special media analogous to the vital conditions in our own organism. Though comparatively little used in

* See THE OPHTHALMOSCOPE, Vol. VIII, 1910, p. 677.

ophthalmology, it is said to be specially beneficial in surgical tuberculosis; on account of "serum accidents," however, it has met with not a little opposition.

In 1908 Frey, of Davos, who introduced its rectal mode of administration, reviewed the cases, 938 in number, then recorded, and concluded favourably towards the serum. The cases gave percentages of 67 improvements and cures against 33 unaltered or made worse; all or nearly all were grave cases of both medical and surgical tuberculosis.

The ophthalmic cases recorded comprise blepharitis, conjunctivitis, keratitis with ulceration, purulent infiltration of the cornea, infiltration with pannus and episcleritis, but no case of tubercle of the iris or choroid.

Verrey's case is as follows.—A young man of 20 had had meningitis at six years and some osteo-periostitis of the tibia later, and was invalided from Africa in October, 1909, for bacillary osteitis of the left humerus, which was followed shortly after his return to Europe by arthritis of the right knee. The humerus was curetted in November, and some fifteen days later, the right eye became red and painful, infiltration of the cornea being noted two days after that. Local treatment availed little, and beyond some slight temporary improvement, the eye grew steadily worse. About three months from this, the left eye became affected in the following manner.—A nodule was observed in the lower half of the bulbar conjunctiva, which spread around the cornea until the whole of the anterior segment of the eye was involved, the cornea itself becoming infiltrated some days afterwards. On May 23rd, 1910, the patient came to Landolt's *Clinique* in a poor condition. There was arthritis of the right knee and a fistula which led to the left humerus and discharged offensive pus. The state of the eyes were as follows: much photophobia, the globes violet-red, chemosis, the limbus covered by a sort of pannus which encroached on the cornea, the central parts of which were both irregularly infiltrated. No view of the irides could be obtained.

Combined with local treatment, a first series of 10 injections of Marmorek's serum was administered *per rectum*. Each injection, 5 cc. in amount, was given in the morning, before any food was taken, the rectum being previously washed out by a copious enema. Two days elapsed between each injection. After 15 cc. of serum had been administered, a definite improvement was noted, but a reaction occurred in the left eye some days later. The eye showed a small, well-defined elevation, yellowish in colour, in the centre of the cornea, and from the limbus to it and encircling it ran a leash of vessels. This diminished in three days and a further improvement in both eyes took place, until at the end of a little more than a fortnight prolonged examination was borne. By three weeks the right vision had improved to 0.06 and after a second series of injections, given at an interval of 10 days from the first, the patient was discharged with the eyes free from inflammation, the vision being R.=0.06 to 0.07, and L.=0.01. Four months later R.V.=1 and L.V.=0.3. The patient's general condition had vastly improved, but the left humerus was in much the same state as previously, and necessitated an operation for the removal of sequestra. Examination of tissue from this region placed beyond doubt the tuberculous nature of the process. BERNARD CRIDLAND.

(10) An abstract of this excellent paper will be found in *THE OPHTHALMOSCOPE* for January, 1911, page 71.

(11) Pinkus and Pick have shown that xanthelasma cells contain a peculiar substance which stains black with osmic acid and stains with sudan. It consists of cholesterin-fatty-acid-ester. Neutral fats and pigment are also present. As regards treatment, there is a concurrence of opinion that excision is the best procedure, but recurrence is common. Schindler, of

Vienna, has had considerable success by treating xanthelasma with radium. He uses a metal plate, 1.5 cm. square, covered by a shellac emulsion containing 25 mg. of radium bromide. This is again covered with shellac. The eye itself is protected by a lead spatula, 3 mm. thick, covered with a thin sheath of vulcanised rubber. This spatula is moistened with lanoline and placed under the lid. Very few β or γ rays can pass through the lead but some of the γ rays get transformed in the lead into *Sagnac's* rays (soft γ rays). These would irritate the bulb, but are wholly absorbed by the rubber. The application was used for fifteen minutes.

T. HARRISON BUTLER.

(12) **Eloui**, of Cairo, has been satisfied with the method of treating these cases by injecting antidiphtheritic serum under the conjunctiva.

(13) **Eustace Smith**, of London, narrates a case of (?) central retinitis cured by the use of an old-fashioned remedy, namely, substantial doses of oil of turpentine. No organic disease could be found in the patient, a girl of 10 years, and the cause of the retinitis was altogether obscure. She had been treated without success with mercurial inunctions. Two drachms of oil of turpentine, with an equal quantity of castor oil, were given every night at bedtime, and in the course of a few days, there was great improvement both in sight and in general health. Smith points out that it is only when the remedy fails to act upon the bowels that any risk is run of irritation of the kidneys. He deplors the fact, finally, that ophthalmic surgeons have given up the use of so valuable a remedy as oil of turpentine.

SYDNEY STEPHENSON.

(14) **Allan** reports a couple of inconclusive cases (one of trachoma and the other of nebula) where the freshly-made infusion of jequirity, dropped into the affected eyes, is stated to have done good. Cautions are given as to the preparation of the infusion, but nothing is said about jequiritol, which we thought had nowadays quite replaced the older remedy.

SYDNEY STEPHENSON.

(15) **Fromaget**, of Bordeaux, after the surgical removal of tuberculous material, used to brush the cutaneous surface with zinc chloride, but since that application sometimes exceeded the desired end, he now employs tincture of iodine. For subsequent dressings he employs Mosey's *plombage iodoforme*, which is composed of iodoform, *blanc de baleine*, and oil of sesame, in proportions that vary according to the case. The mass, which is kept in a metal tube, is liquified by being held in water at a temperature of 50° C., and the material is then squeezed into the depths of the wound. The application is painless. The wound, which is kept open, is covered with sterilised gauze or wool. Fromaget during the last year has treated successfully four patients on the lines described above.

SYDNEY STEPHENSON.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

THE LENTICULAR INSERTION OF THE ZONULE OF ZINN.

To the Editor of THE OPHTHALMOSCOPE.

DEAR SIR,

When the pupil is fully dilated, a ring, concentric with the periphery and a short distance from it, may generally be seen in the lens with the mirror held at a distance. I have never seen this mentioned in literature; and, though I have spoken of it at intervals for twenty years, it seems to be generally ignored. I have always thought it to be the insertion of the zonule of Zinn into the capsule, and the paper in THE OPHTHALMOSCOPE of March 1st, by Dr. E. Aguilar, tends to confirm me in that belief. It has seemed to me strange that I have never seen or heard any reference to what has appeared to me a distinct and not uninteresting phenomenon.

Yours truly,

A. W. STIRLING.

ATLANTA,
GEORGIA, U.S.A.
March 23rd, 1911.

BOOK NOTICES.

Refraction and Motility of the Eye. By ELLICE M. ALGER, M.D., New York. With 122 illustrations. Philadelphia: Davis Co. 1910. Pp. 364. Price 6/-

THIS book is intended by the writer to satisfy the requirements of the general practitioner, and also of the student of ophthalmology, and we can recommend it as likely to prove a mine of instruction and interest to both.

Alger has spared neither trouble nor space in trying to make the work complete, and has succeeded to a noteworthy extent. Whilst he takes into consideration everything likely to be of use, he states frankly his opinion on many subjects, which adds much to the value of a text-book of this kind.

The first chapter is (as it should be) a simple account of the phenomena of optics likely to be of service to the student of ophthalmology, and the second is wisely devoted to a description of the normal eye, both as an organ and as an optical instrument.

Thence the author passes on to review the various methods of examining an eye, the refractive state in different conditions, hyperopia, myopia, astigmatism, etc., and the motility of the eye and its errors.

In later chapters such subjects as colour blindness, field of vision, and the relation of functional eye diseases to general medicine, are briefly gone into.

The writer has shown a wise discretion in not saying too much, thus leaving something for the student to learn of his own experience, and we may say that dogmatism is avoided in a most satisfactory manner.

There are, however, a few subjects which might have been mentioned, such as the ophthalmometers of Reid and of Sutcliffe, both having uses and special points which the instrument of Javal has not; mydriatics, such as euphthalmin and eumydrin, which are useful in certain cases, etc.

The book is very nicely printed and is nearly free from the small errors which creep into almost all such publications, but on page 47 the reader is given to understand that the "minimum visual angle" is five minutes instead of one minute. There are a few obscurities of construction which mar the readability of the text; for example, on page 301 the statement appears that "Paralysis or absence of one or both superior recti has been noted in cases of congenital ptosis." This may be true enough, but we think that a word of elucidation is required.

On the whole, it may fairly be said that Alger has made a book which deserves success.

LESLIE BUCHANAN.

Transactions of the Ophthalmological Society of the United Kingdom.

Volume XXXI, fasciculus i, 1911. London: J. and A. Churchill, 7, Great Marlborough Street. Price, 4/- net.

A slim volume of forty-six pages containing an account of the work done at the Ophthalmological Society during the first two meetings of the present session, 1910-1911.

Bulletins et Mémoires de la Société Française d'Ophtalmologie.

Twenty-seventh year. 1910. Paris: G. Steinheil, 2, Rue Casimir-Delavigne.

A good deal of this substantial volume of 596 pages is occupied with an account of the discussion upon the comparative value of the different methods of illumination, opened by Professor Gariel, of Paris. This has already been noticed in the columns of THE OPHTHALMOSCOPE by the late Mr. Henry Power (*see* Volume VIII, 1910, p. 384). The remainder of the book is occupied with reports of cases and various communications, many of which have already been abstracted in our columns.

Bulletin de la Société Belge d'Ophtalmologie. No. 29. Bruxelles:

L. Severeys, 34, Rue Botanique. 1910.

This paper-backed volume of 250 small pages represents the work done at the twenty-ninth meeting of the Belgian Ophthalmological Society held on the 24th and 25th September, 1910.

Golden Rules of Refraction. By ERNEST E. MADDUX. Third edition, revised. Bristol: John Wright and Sons, Limited. Undated. Price, 1s.

Golden Rules of Refraction by Dr. Ernest Maddox, contains a surprising amount of information in tabloid form. It is intended chiefly for general practitioners, who are commencing to study refraction, but more experienced practitioners may glean many a useful hint from its diminutive pages. The methods described by Maddox are accurate and expeditious. He advises us to begin our investigation of the case with retinoscopy, and not to resort to the trial-frame and lenses until we have gained a clear idea as to the patient's refraction. One is pleased to see the use of Edward

Jackson's "crossed cylinder" endorsed as an aid to exact work. He explains that the "crossed cylinder" affords a purer test of astigmatism than an ordinary cylinder from the trial case, inasmuch as it affects both meridians equally and in opposite ways. When testing at the types, the advice is given to work the concave lenses *up* and the convex lenses *down*. It is interesting to note that, in the author's experience, the constant wearing of fully correcting glasses retards the growth of incipient cataract more than any other measure known to him.

Maddox, as a rule, manages to convey his meaning so clearly that we make no apology for drawing his attention to one or two sentences, the construction of which might be bettered. "Some noses are not meant for pince-nez at all" (p. 89). Of course not, or for spectacles either. "A localizer for this purpose has been made and published, but not perfected." (p. 83). Speaking of the treatment of high myopia by operation (p. 49), Maddox remarks: "It is most advisable when as high as 22D. provided the fundus be suitable" (*sic*). He speaks of averting an act of accommodation (p. 47) almost as if it were an act of Providence. Describing the Maddox rods (modestly called the "glass rod disc" by the author) on p. 42 we read: "First holding the rods horizontal, notice whether the vertical streak of light now visible passes the flame to the same side as the eye that is looking through the rods, or to the opposite side." Here the word "notice" should obviously be "ascertain." Of actual misprints, the opusculum contains very few. On p. 90 "towards" is spelled "towords."

Maddox's tiny book, in our opinion, is extremely well done. It will repay reading and reading again.

SYDNEY STEPHENSON.

Vicious Circles in Disease. By JAMIESON B. HURRY, M.A., M.D. (Cantab.). London: J. and A. Churchill, 7, Great Marlborough Street. 186 pp. 1911. Price 6s. net.

"*Medicis Medicus hoc Opusculum.*" With these words Dr. Hurry dedicates to his fellow medical practitioners his rather extraordinary collection of vicious circles. It is true that the majority of such circles are pretty well recognized in the daily life and work of every medical man, yet it is undoubtedly useful, and very interesting, to have them thus collected in book form and set forth and explained in the way that Dr. Hurry has done.

The volume is an elegant one in the matter of style. Indeed, we cannot recall any medical book got up quite like this, at all events at anything like the price.

The plan of the work may be gauged from the author's introduction.—"The object of these pages is to study conditions in which Nature's attempt to cure reflects small credit on her provisions, and the study will be found full of suggestion and guidance for all whose labours lie in the field of medicine. . . . The scheme adopted in the following pages is in the first place to consider the natural orders, so to speak, into which vicious circles may be grouped, some examples of each being given. The great systems of the body are then taken one by one in order that attention may be drawn to various diseases which are liable to be complicated by circles. . . . The necessity of "breaking the circle" before recovery can take place is then next emphasised, instances being given to show how circles may be broken both by natural and by artificial means."

Circles associated with the eyes and eyelids receive a considerable share of the author's attention. Of these perhaps the most important is glaucoma which "perpetuates and intensifies itself in a vicious circle" (Priestley Smith). Other important vicious circles are those which occur in phlyctenular

conjunctivitis, in dacryocystitis, and in papilloedema. The author does well, we think, to include the circle which is kept up by the action of tinted lenses in unsuitable cases. The circles associated with errors of refraction are also given.

In a great many cases the circles are represented schematically in a very useful manner.

The book ends with the following words, and although we do not quite see the necessity for classical quotation, the sentiment is sound enough: "The physician who cultivates a philosophic insight into the interacting forces, will reap the reward of seeing many a patient *revocare gradum superasque evadere ad auras*."

ERNEST THOMSON.

NOTES AND ECHOES.

Obituary.

Thomas Reid, M.D., LL.D. Born 1830: died 1911.

As we were able to record briefly in our last issue, Dr. Thomas Reid, of Glasgow, died on March 23rd in his eighty-second year. For some little time he had not enjoyed quite his former robust health, but his sudden end came as a shock to his many friends.

With the death of Reid is broken the last link which bound us to his great predecessor William Mackenzie. This link was at best, however, a slender one, for Reid saw the great master operate only upon one occasion. Still, through George Rainy who had been in practice with Mackenzie and with whom in turn Reid had been similarly associated, the traditions of the Glasgow school of ophthalmology have been handed down. Thus it happens that most of those interested in eye work in Glasgow to-day have come more or less directly under the influence of Mackenzie, transmitted through Rainy and Reid.

Dr. Reid was a remarkable man, although his innate modesty, which was combined with that difficulty in communicating his ideas and experience to others, so often found in men of great mental capacity, prevented him from becoming so well known as he should have been.

Born in 1830, in the parish of Shotts, Lanarkshire, in early life he was apprenticed to a cabinet maker and came to Glasgow in order to study design in furniture. The prospect did not wholly please him, although, in after life, the craftsmanship he had gained was something which he proudly regarded as the foundation of his exceptional manual dexterity not merely as an operator, but also as a microscopic anatomist. He found that the study of medicine promised a greater fulfilment of his ambition than his original occupation, and by his own exertions he took the University course. In 1857 he graduated M.D. Glasgow, went into general practice, and made many lifelong friends.

Mere practice, however, did not satisfy his scientific bent. With very imperfect instruments and apparatus (as we should judge them at the present day), he worked at microscopic anatomy, and obtained wonderful results,

more particularly in connection with the eye, the cochlea, and the spinal cord. He continued to do microscopic work to the very end of his life, and by no means confined his researches to ophthalmology.

Scientific work soon brought Reid into association with Allen Thomson, by whom he was recommended to take up pathology. He preferred, however, to adopt ophthalmology as a special subject, and so became a student at the Glasgow Eye Infirmary in 1861 under George Rainy and William Anderson. He was non-resident house-surgeon and junior assistant surgeon in 1862, became assistant surgeon in 1865, surgeon in 1867, and in 1884 received the title of Senior Surgeon, which previously had been held by Mackenzie and Rainy. In 1900 he retired from his public appointments after nearly forty years' service at the Eye Infirmary.



The late DR. THOMAS REID.

In the year 1869, Dr. Reid was appointed Waltonian Lecturer at Glasgow University in succession to George Rainy. In this lectureship Reid had no successor, for, in accordance with the deed of gift, which excludes compulsory subjects of the medical curriculum, the lectureship ceased to be an ophthalmological one on the retirement of the then holder.

Although Dr. Reid's published contributions to science were not very numerous, his general scientific attainments, his microscopic and microphotographic work, the ophthalmological studies which resulted in the introduction of the well-known Reid ophthalmometer, and the less known

although ingenious, colour perimeter, did not by any means pass unnoticed. He received from his *Alma Mater* the degree of LL.D. in 1896, was awarded a gold medal by the University of Turin, was elected a foreign corresponding Member of the Royal Academy of Medicine of Turin, and, in 1898, received from the King of Italy the high order of "Commendatore of the Crown of Italy." Of this decoration he was justly proud.

The death of Dr. Reid leaves a wide gap in professional circles in Glasgow and the West of Scotland. His exceptional powers of memory coupled to so many years of work among eye patients made his opinion on an obscure case something in the nature of a judicial verdict, especially to those who had been his students.

Outside the profession, no less than inside, will his loss be felt. Amiability and natural wit and the love of books, had brought him many friends among those who had been patients, and by these he will be mourned no less than by professional brethren.

To Mrs. Reid, whose distinguished husband's death we all deplore, we tender our very sincere sympathy.

The death is announced at the age of 79 years of Surgeon-General Jeffery Allan Marston, C.B., honorary surgeon to the King. He was the author of a famous communication dealing with ophthalmia, which was published in the *Archives of Medicine* of April, 1862, and in which occurred the oft-quoted phrase that "the palpebral conjunctiva offers a delicate test and evidence as to the hygienic conditions of a regiment." At the time this communication was written Marston was assistant surgeon to the Royal Artillery.

We regret to announce the death of W. Nagel, professor of physiology in the University of Rostock, at the early age of 41 years. His researches upon the specific energy of sense and the action of light upon the retina are known the world over. Unfortunately, he succumbed before he had completed the third edition of v. Helmholtz' *Handbuch der physiologischen Optik*, of which he was one of the editors. Dr. Winterstein has been nominated to succeed Nagel at Rostock.

The deaths of the following American and Canadian ophthalmic surgeons are announced:—James S. Hopkins (New York), Frank H. Koyle (New York), George F. Emery (Ottawa), Julius Pohlman (Buffalo), Clarence W. Heath (Chicago), and Adolph Kraemer (San Diego, Cal.).

Dr. S. Logetschnikoff, director of the Moskau *Augenheilanstalt*, and president of the local Ophthalmological Society, died on March 19th last. He was the Nestor of Russian ophthalmic surgeons.

As we go to press we learn, with deep regret, of the death, from uræmia, after a fortnight's illness, of Dr. Charles A. Oliver, of Philadelphia, one time co-editor of THE OPHTHALMOSCOPE. In our next issue we hope to publish some notes of our distinguished colleague's life. R.I.P.

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Privat-dozenten, R. CORDS has been recognized as *privat-dozent* of ophthalmology in Bonn; Hermann Ulbrich in Vienna; K. H. Sattler in Königsberg; and Gaetano Samperi in Turin.

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Appointments. SIR ANDERSON CRITCHETT, Bart., has been appointed a Vice-President of the Kent County Ophthalmic Hospital.

Mr. L. V. Cargill has been appointed governor of King's College, Wimbledon.

The Court of Directors of the Glasgow Eye Infirmary have granted the title of extra-surgeon to those of the assistant surgeons who have had over fifteen years' service, namely, A. Lewis McMillan, Henry L. G. Leask, and W. Cochrane Murray.

Dr. S. McMurray has been appointed ophthalmic surgeon to the Longton Cottage Hospital, Staffs.

Dr. L. Borsch, formerly of Philadelphia, has been appointed ophthalmic surgeon to the Trinity Lodge Hospital, Paris, in succession to Dr. Bull, whose recent demise we all deplore.

Dr. J. Chaillous has been appointed *médecin adjoint* to the Quinze-Vingts, Paris, in succession to Dr. Trousseau, deceased.

Dr. Lodato has been appointed professor of ophthalmology in Palermo.

The title of professor has been bestowed upon Dr. Karl Stargardt, of Kiel.

Dr. Birnbacher has been appointed director of the Graz eye *klinik*.

The following are the appointments made to the Paris Hospitals for the year 1911-1912:—**Hôpital Cochin**.—Ophthalmologist, Monthus; externes, Mlle. Borch, Polonowski. **Hôpital Beaujon**.—Ophthalmologist, Poulard; externes, de Carvalho and Raphaël. **Hôpital Lariboisière**.—Ophthalmologist, Morax; assistant, Magitot; adjoint, Landrieu; internes, Toulant, Ducamp; externes, Mouradian, Blacque, Fau, and Darrieux. **Hôpital Laennec**.—Ophthalmologist, Rochon-Duvigneaud; assistant, Caillaud; adjoint, Godéchoux; interne, Monbrun; externes, Roulliès, Heurtel, and Gérard. **Hôpital des Enfants-Malades**.—Ophthalmologist, Terrien; interne, Michaux; externes, Chéron, Dagnon, Barbion, and Mlle. Simon.

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The Diseases of Aliens. LEAVE to land in this country under the Aliens Act was refused to 623 immigrants during the years 1909 and 1910, the particular grounds of rejection being as follows: trachoma, 299; other eye diseases, 25; venereal diseases, 90; skin and scalp diseases, 25; lunacy or idiocy, 5; tubercular diseases, 8; miscellaneous diseases, 10; infirmities likely to lead to chargeability (including cardiac disease, deformity, senile decay, paralysis, etc.), 161.

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The Central London Ophthalmic Hospital. THE lease of the old buildings in Gray's Inn Road having almost run out, this Hospital has acquired a site in Judd Street, close to St. Pancras terminus, and building operations have been begun. In order to complete the building, the Hospital is appealing to the public for the sum of £5,000.

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The Notification of
Ophthalmia
Neonatorum.

ON and from March 13th last ophthalmia neonatorum became compulsorily notifiable in the County of London

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Difficulties at the
Liverpool Eye
Hospital.

THE following paragraph is taken from a recent issue of our contemporary *The Hospital*.—Peculiar interest was given to the recent annual meeting of the Liverpool Eye and Ear Hospital from the fact that the Lord Mayor, who presided, is vice-chairman of the Medical Inspection of Schools Sub-Committee, and the great financial difficulties of the hospital are credited by some people to the action of this committee in reporting to parents the results of their inspection. The general position at least is this: there have been about 12,000 new eye and ear cases, the hospital debt has risen to £3,246, and, as the Lord Mayor said, cases of disease must be reported to the parents, and those who can afford to pay must be prevented from sending their children to the hospitals. How many can afford to pay is not very easily ascertainable; a hospital in debt cannot afford to take them; a struggling practitioner cannot afford to be deprived of his fees for attending to them, and the education rate is already being grumbled at, so that the educational authorities will not very easily raise it again. This state of affairs is not only to be found in Liverpool, it is true, but the Eye and Ear Hospital is not supported there as well as similar institutions where the same difficulties exist.

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Scottish
Ophthalmological
Club.

WE are interested to learn that the Scottish Ophthalmological Club, to the proposed formation of which we referred on a previous occasion, has now actually come into being. Membership of the Club is, in the meantime, restricted to those who hold "Eye" appointments at any of the public Hospitals or Dispensaries in Scotland. The business at the meetings for the most part will be purely clinical. The transactions will not be communicated to the Press. Trade exhibits will not be allowed. In fact, the promoters have aimed at the establishment of a private scientific club, pure and simple, the meetings of which shall be quite informal. We understand that several clubs of this kind already exist north of the Border, and there seems to be no reason why the new-comer should not be as successful as the others have been.

* * * *

An Optometry Course
at Columbia.

COLUMBIA UNIVERSITY has announced that it will offer next September in the department of physics, independent of the medical school, a course in optometry of two years' duration, intended to equip its graduates so that they may examine the eyes of the public for glasses. Certificates will be given from the University Board of Extension Teaching on the completion of the two years' course.

This action of Columbia University is a most surprising backward step in educational progress. It is true these optometry graduates are not to use drugs or treat diseases, but they will secure the endorsement of a great university on their ability to prescribe proper lenses for refractive error and to relieve headaches and other asthenopic symptoms. We wonder where the

medical faculty of Columbia have been to allow such surprising action to be taken. Surely Hermann and Arnold Knapp do not approve of separating the treatment of refractive error by the prescription of glasses from medical practice in the hands of properly qualified physicians. It should be self-evident that it is just as much a part of the practice of medicine to relieve eye-strain with lenses as to relieve pain due to disease by the administration of drugs. Both methods of medical practice require skill and knowledge obtained only through study leading to the degree of doctor of medicine; nor can any two years' course in optics and optometry give any training sufficient to treat such an important and vital organ of the human body as the eye.

We hope the medical profession will unite in a protest against this action of Columbia University. There may be need of a school of refraction, but it should be a part of the medical faculty and should teach candidates for the degree of doctor of medicine, and not "optometrists" and opticians.—*Medical Review of Reviews*, December, 1910.

* * * *

The Standardization of Lenses. THE question of the inaccuracy of lenses of the trial case has been raised once more, this time by Professor Algernon Tassin, of Columbia University, New York, in an article on "Why our glasses don't fit," which he had contributed to an American periodical called *Good Housekeeping*. Although the professor's charges are levelled primarily against opticians, yet they are possibly true in some degree as regards the ophthalmic surgeon. What steps does the average surgeon take to ensure the accuracy of his test lenses? As a rule, he depends upon nothing beyond the reputation of the manufacturers from whom he has obtained them. In this country, at all events, there is no longer any excuse for inaccuracy, since the National Physical Laboratory at Teddington undertakes for a small charge* to verify and to certify as correct, to within about 2 per cent., any boxes of lenses sent to the institution for that purpose (see *THE OPHTHALMOSCOPE*, 1909, p. 134). How many ophthalmologists, we wonder, have as yet availed themselves of the privilege? Another reflection that occurs to anybody who reads the professor's communication is that every ophthalmic surgeon, as a matter of common sense, should be in possession of an accurate apparatus (if such there be) for testing the lenses made presumably in accordance with his prescription by the optician.

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A New Periodical. WE have received the first number of a new monthly periodical, the *Revue Française d'Optique et de Lunetterie*, edited by Dr. Caillaud, and published at No. 142, Bd. du Montparnasse, Paris. The avowed object of the publication is to develop the practice of optics in France. It will endeavour to form, as it were, the complement of the ophthalmological periodicals. The *Revue* has fixed its annual subscription at eight francs.

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The Licensing of Optometrists. IN twenty-four States of the North American Union, recent legislation has permitted the practice of what is known as optometry. By enabling act, persons entirely devoid of training in medicine or in the broad principles of the sciences upon

* The fee for testing a trial case of about 160 lenses is £1 15s., and the time required for the actual test is about two days—EDITOR.

which the art of medicine depends, have been licensed to estimate errors of refraction, and to fit glasses without prescription by a medical man.

The medical profession's opposition to this form of practice was futile until recently, but since the appointment of a committee by the Ophthalmological Section of the American Medical Association, acting in conjunction with the Association of American Ophthalmologists, and enlisting the active services of the profession whenever legislation has pended concerning the licensing of optometrists in those States where it is not yet permitted, not one single Optometry Bill has become law. This is conclusive evidence that the medical profession, when combined and working towards a definite end, is not so helpless politically as it is supposed. In the State of Indiana, indeed, the medical men were dissatisfied with the manner in which a Governor of the State had refused to permit the necessary restriction on small-pox which the Health Officer had attempted. The result was that the profession organized and prevented the re-election of this Governor.

If optometry is not to be permitted, the public will have to be served by the medical men, and the Ophthalmological Committee has recommended that the medical schools insist upon every student learning to refract and to fit glasses. They recommend that specialists be called in at a moderate fee, until medical men can be trained in sufficient numbers. These trained men would recognise defects earlier than the present general practitioner, and the benefit to the community would be great, for optometrists, besides failing to diagnose grave diseases with ocular symptoms, such as those causing choked discs and retinitis, are not subject to the ethical standard of a learned profession, and their purely commercial outlook does not incline them to protect the public when their own pockets are in question.

Refraction itself is largely a mechanical art, and is quite easy to learn. Some examining boards already require that all candidates for a licence to practice shall use the ophthalmoscope, and employ test lenses efficiently in the presence of the examiner.—*Medical Press and Circular*, April 5th, 1911.

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Philadelphia
Medical Club.

Dr. S. LEWIS ZEIGLER has been elected first vice-president, and Dr. McCluney Radcliffe director of the Philadelphia Medical Club, a large and flourishing organisation.

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The New
Physiology.

THE *Daily Telegraph* has recently eclipsed its well-known and picturesque command of the English language by its excursions into the realm of physiology. From an article describing George Gray, a famous billiard player, we learn that the individual in question "is gifted with exceptional sight. The retina of his eye is of the rare violet-purple variety—the 'one pair in a million,' as an oculist who examined them observed, which is so receptive of light rays."

DOWN BROS., LTD., of St. Thomas's Street, London, S.E., have secured the Gold Medal (highest award) for Surgical Instruments and Aseptic Hospital Furniture at the United Provinces Exhibition at Allahabad, 1910.

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CONTENTS.

Original Communications.—

	PAGE
1. Ernest Thomson, M.D.—On Dacryops	396
2. Edgar Stevenson, M.D., and Chas. A. Adair-Dighton, F.R.C.S.— Actinomycotic Meningitis due to sphenoidal sinus suppuration, causing Death four days after excision of Right Eye ...	403
3. Archibald Stanley Percival, M.A., M.B., B.C.—Visual Efficiency	405
4. Major R. H. Elliot, M.D., F.R.C.S.—An Answer to certain observations that have been made on the subject of the operation of trephining for the relief of Glaucomatous Conditions	409

Clinical Memoranda.—

1. Ernest E. Maddox, M.D., F.R.C.S.—Note on Bifocal Glasses ...	412
2. W. Duncan Lawrie, M.D., F.R.C.S.—Acute Dacryocystitis due to the Pneumococcus in a child seven years of age ...	412

Novelties.—

Fixation Speculum. By W. H. Brailey, M.A., M.D.	413
--	-----

Review.—

On Sympathetic Ophthalmia. By R. Beatson Hird, M.D., F.R.C.S.	414
---	-----

Translation.—

Sophol as a remedy in Ophthalmo-Blennorrhœa Neonatorum. By Dr. Otto v. Herff	432
--	-----

Current Literature.—

I. Embryology	436
II. Tuberculosis of the Orbit	438
III. Relationship between diseased Retinal and diseased Cerebral Vessels	441
IV. "See-saw" Pupils	441
V. Amaurotic Family Idiocy	442
VI. Colloid excrescences of Bruch's membrane... ..	445
VII. Marginal Ectasia of the Cornea	445
VIII. Nystagmus	449
IX. Remedies	452

Correspondence... ..	459
----------------------	-----

Book Notices	460
---------------------	-----

Notes and Echoes	462
-------------------------	-----

ORIGINAL COMMUNICATIONS.

ON DACRYOPS.

BY

ERNEST THOMSON, M.D.,

SURGEON TO THE GLASGOW EYE INFIRMARY.

THE condition which, since the time of Schmidt, has been known under the name of Dacryops, is of such rarity, that no excuse appears to be necessary for calling attention rather fully to a case which came recently under my care.

In the following article, after relating my own case and the results of the pathological examination of the specimen, I shall endeavour to bring together the principal facts and opinions and to focus our knowledge on the subject.

Case History.

James B——, aged $7\frac{1}{2}$ years, was brought by his mother to the Glasgow Eye Infirmary, Charlotte Street, on January 27th, 1911.

Mrs. B. stated that she had for long noticed that the child's right eye looked a little smaller than the left. By this she meant that the palpebral fissure was smaller on the right side. Only since a few days previously had she seen an actual swelling under the lid, and, thinking that it was getting larger, she now brought the boy for advice.

Inspection revealed a slight fulness of the right upper skin fold, and a slightly smaller fissure on the right side than on the left. On looking under the upper lid, a translucent swelling, bluish-black in colour (as my original note has it), was observed between the lid and the eyeball. On everting the lid, this swelling did not prolapse, but seemed to go backwards. When the patient looked down while the lid was gently supported against the orbital margin, the distance between the swelling and the upper corneal limbus was $\frac{1}{4}$ inch.

The swelling extended in the fornix pretty nearly from the outer to the inner canthus. It was by no means limited to the region of the outer canthus. It was typically cystic in appearance.

The mother had never noticed that the swelling became larger if the child cried.

At the second visit there was no change in the size or appearance of the swelling, and I came to the conclusion that the mother had probably been mistaken in supposing that there was any recent increase.

On February 15th, 1911, under chloroform, an opening was made in the conjunctiva over the tumour, which latter occupied nearly the whole region of the upper *cul-de-sac*. As this opening was gradually enlarged, the cyst suddenly prolapsed through it. When thus prolapsed it was very tense and could be gripped only by means of toothed forceps. With the closed points of the scissors a careful dissection was made, but, just as it began to seem feasible to remove the cyst in its entirety, the toothed forceps tore through the thin wall and a jet of limpid fluid, which had all the appearance of lacrymal secretion, spurted out under considerable pressure. It was not deemed advisable to proceed with the dissection of the collapsed cyst, but as large a piece as possible of the cyst wall was excised and the conjunctival

opening closed with a suture. Previously to doing this, the extent of the cyst cavity was estimated by the introduction of a probe. This was found only to be arrested by the orbital wall above.

The patient was dismissed on 21st February, and has not since put in an appearance.

Microscopic Examination of the Specimen.

The portion excised was sectioned in paraffin by Dr. Logan Taylor, and, in consequence of alcohol treatment, had shrunk very greatly. It was examined by Dr. Leslie Buchanan and myself jointly. Under the microscope, it measured 5 mm. by 4 mm. It consisted of a mass of fibrous tissue with, at one side of it, the section of the folded cyst itself. Apart from the fibrous tissue to which it was attached, the cyst wall was very thin.

The cyst portion was lined throughout with epithelium, but, partly owing to damage in the process of preparation, and partly, in all probability, owing to pressure changes, it was found impossible exactly to determine the character of this epithelium. Speaking generally, it was columnar and looked like duct epithelium.

The mass of fibrous tissue which was attached to one wall of the cyst presented considerable evidence of inflammatory reaction. There were in it many blood vessels, mainly capillary, and quite a number of hemorrhages of various sizes.

Attached to the margin of the section, near to the cystic portion, were two small but well-defined masses of altered epithelial tissue which, on careful scrutiny, showed distinct evidence of glandular origin; and on the diametrically opposite side of the section there were some small masses of cells which, at first sight, seemed to belong to the tissue about the vessels, but which after careful study, were resolved into epithelial cell masses.

From these appearances, then, the cystic structure might be said to lie more or less surrounded by small masses of gland tissue, altered in character by the combined pressure of the cyst and the inflamed fibrous tissue.

From this somewhat scanty evidence it is hardly possible, perhaps, to draw very definite conclusions as to the origin of the cyst. It seems reasonable to suppose (*vide infra* regarding the anatomy of the part) that it might be due to distension either (1) of a duct of the main gland, or (2) of a duct of the accessory gland. In either case, bearing in mind the position of the accessory gland quite close to the lid, the presence outside the cyst wall of gland epithelium is quite intelligible.

From the large size of the cyst, as observed clinically, and its situation along most of the length of the fornix, combined with the fact stated in the case history, that a probe passed into the cavity reached the orbital roof, one can hardly avoid the conclusion that the distension must have involved the secreting portion of the lobule connected with the duct.

The Ætiology of Dacryops.

It must be admitted that the exact ætiology of this rare disease is still to seek. All that I can do is to add my quota to the general stock of facts and opinions.

The master work on the subject is that of zur Nedden¹, who, in 1903, brought together 33 reported cases, dating from Schmidt's two original ones at the beginning of last century, and added two of his own. To zur Nedden's communication I hereby accord full acknowledgment.

It may in the first place be wise to clear the ground by stating what dacryops is *not*, before discussing what it *is*.

Schmidt² in 1803 accurately described for the first time what Mackenzie called "encysted tumour in the lacrymal gland." Schmidt had called it "*glandula lacrymalis hydatodea*." It consists, according to Mackenzie, of the collection of a thin fluid in the situation of the upper portion of the lacrimal gland. The disease is very rare, for "even Beer's vast experience had brought only three cases under his observation."

Whatever this disease may have been the symptoms were of a very severe type. One need not go into all the details of Mackenzie's account of it. The description is that of a tumour pressing on the neighbouring parts and rapid in its growth, which gave rise to proptosis, pain, diplopia, loss of vision, and ultimately, if unrelieved, coma and death. Though Mackenzie did not consider that this disease was entozoa, one gathers from de Wecker and Landolt³ that these authors considered it so.

By the term dacryops, then, the authors who have written on the subject do not mean an acute inflammatory swelling in the orbit which leads, if neglected, to loss of the eye or even of life.

Two questions now face us, namely, what is dacryops and what are its causes?

I.—What is Dacryops?

The statements of writers as to what the condition actually is vary considerably. While the majority describe it as a cystic dilatation of an efferent duct of the lacrymal gland, without distinctly giving an opinion as to whether the main gland or the palpebral portion is concerned, a minority of writers consider it to be a cyst of the gland or of the gland and a duct.

What between the rarity of the condition and the small number of microscopic examinations which, consequently, have been made, it is quite easily understandable that definite statements on the exact portion of the secretory mechanism involved should be uncommon. Lagrange,⁴ however, stated that in his case the cyst had developed out of the duct of the *palpebral* lacrymal gland.

The *symptoms* as given by different writers do not vary very greatly. Indeed, it is obvious that, for the most part, one writer has copied from another. I shall quote two authors only, and these separated from one another by many years.

Hulke,⁵ in his paper on the subject of lacrymal cysts and true lacrymal fistulæ, says, "Dacryops commences as a small cystic tumour, first noticed in the upper and outer part of the upper eyelid. The skin glides freely over it, but the tumour extends backwards beneath the border of the orbit towards the lacrimal gland. If the lid be drawn up on to the brow and pressure be simultaneously applied in a downward and inward direction a tense, elastic, fluctuating swelling instantly starts out between the eyeball and the inner surface of the eyelid. So long as the cyst is small the natural movements of the eyeball are unrestricted; but when it has attained a large size, and especially if it has reached backwards beneath the margin of the orbit, it hinders the movements of the globe, and may even cause its protrusion. The most characteristic and striking sign of dacryops is the sudden enlargement which the tumour undergoes when the patient cries."

Ball,⁶ in his text-book, puts it thus:—"Cyst of the gland or of an efferent duct is a rare condition which may be present at birth, but is usually acquired. It forms a tumour varying in size from a pea to a pigeon's egg situated at the

upper and outer part of the upper lid, and extending backward to the orbit. On everting the upper lid, a translucent, elastic, swelling of a bluish-pink colour presents itself."

To these two statements I shall add (a) that the colour of the cyst as described by different writers varies considerably. Thus, it is said to be "bluish," "bluish-pink," "bluish-white," and, by myself, "bluish-black." I now consider, however, that "bluish-grey" describes the colour in my case better; (b) that although Ball says it may be present at birth I do not know where it is specifically stated to have been so observed; (c) that some writers, *e.g.*, de Wecker (*loc. cit.*) speak of the cyst as *lobulated*, others *e.g.*, Soelberg Wells⁷ as *nodulated*, (d) that in my own case the symptom of increased size on weeping was not known to occur, possibly owing to the already tense condition of the cyst; (e) that bilateral dacryops has twice been reported, by Ilcken¹⁰ and by Lange¹¹; (f) that sometimes the block is not complete, and fluid can be squeezed out of the cyst. Such a case was reported by von Graefe.¹²

Since, then, a study of the literature does not seem to yield very exact information as to the anatomical foundation of dacryops, it may be useful to try to establish certain probabilities out of the clinical facts and the anatomy of the part.

Quain⁸ in describing the lacrymal apparatus says:—"The upper convex surface of the lacrimal gland is lodged in a slight depression of the orbital plate of the frontal bone, to the periosteum of which it is united by fibrous bands; the lower surface is adapted to the convexity of the eyeball, and is in contact with the upper and the outer recti muscles. The fore part of the gland, separated from the rest by a thin layer of fascia, and sometimes described as a distinct gland (*glandula lacrimalis inferior of Rosenmüller*), is closely adherent to the back of the upper eyelid, and is covered on the ocular surface merely by the conjunctiva; its lobules are small and separate, with minute ducts, some opening separately, others joining the ducts from the principal gland, which are also very small. The number from both divisions of the gland seldom exceeds twelve. After running obliquely under the mucous membrane, and separating at the same time from each other, they open in a row at the fornix conjunctivæ by separate orifices at its upper outer part."

Foster⁹, says that the lacrymal gland is "imperfectly divided by an extension of the tendon of the levator palpebrarum into two masses."

It is fairly evident from the foregoing anatomical points that the different characters of dacryops as observed by different writers can be explained quite well. The various statements that the tumour is "small and situated to the outer side," that it is "lobulated," "nodulated," "extends pretty nearly from the outer to the inner canthus," that it "is surrounded by small masses of gland tissue," that "the cyst was extremely large, was composed really of three cysts, and surrounded the lobulated lacrimal gland," (Foster's case¹³), all seem to me to depend upon this, that the result of interference with an excretory duct will vary according to anatomical circumstances. Thus, to give examples, the duct might be a short one only connected with a lobule of the accessory gland; it might be one connected solely with the main gland; it might be one common to both parts of the gland. Finally, it is conceivable that more than one duct of either part of the gland might be involved. The clinical picture would vary considerably under these various circumstances.

This idea, that the clinical picture of dacryops is a variable one in accordance with the anatomical arrangement of the parts involved, is confirmed by several of the few cases which have been reported since

zur Nedden wrote in 1903. In the case reported by Gilbert¹⁴, the anterior wall of the cyst developed in the tissue of the upper lid and dissected the lid into two leaves. The conjunctiva, the tarsus, and the posterior wall of the cyst, were closely adherent to the eyeball. Welikanow¹⁵ has recorded, apparently for the first time, a case in which—if my interpretation is correct—the main lacrymal gland was dislocated forwards, and was cystic in its anterior part. “The fore part of the gland was formed of a cyst, which was lined with two layers of cylindrical epithelium similar to that of the excretory ducts.” Here, then, we have distinct evidence that the cyst in dacryops may really involve the main lacrymal gland itself, secondarily, one must assume, to blockage of the excretory ducts. In the abstract of Welikanow’s article, it is stated that the excretory ducts (plural) were widened.

Capolongo¹⁶ asserts definitely that his case involved the accessory gland of Rosenmüller.

We may say, then, in answer to the question which heads this paragraph, that *dacryops is a cystic dilatation of one or more ducts of the main lacrymal gland or of the accessory gland of Rosenmüller, and that these glands themselves may in some cases be involved in the cystic process.*

II. What is the Cause of Dacryops?

It might be supposed that this question could be very simply answered by saying that dacryops is caused by blockage of one or more excretory ducts, and that we have to do only with a retention cyst.

Such an answer, however, merely evades the real question as to what is the cause of the blockage.

Schmidt, in considering his cases to be congenital, assumed that some of the ducts terminated in the cellular tissue of the upper lid instead of opening on the surface. The secretion of the gland was poured into the interstices and formed a kind of cyst by distension. As the cyst enlarged, it acquired a capsule by the condensation of the surrounding cellular tissue (Hulke, *loc. cit.*).

Beer¹⁷ held that four out of his six cases were congenital, in accordance with the view of Schmidt.

Bilateral cases have been reported by Ilcken¹⁰ and by Lange¹¹. There can be no doubt that in the absence of a probable cause it seems reasonable to assume a congenital origin for some of these, although we know now, from various microscopic examinations, that the wall of the cyst is not formed as supposed by Schmidt, but by the dilated duct or gland tissue. All the same, I am doubtful whether there is on record any case in which the congenital origin is beyond suspicion. If dacryops really does occur congenitally, then, *pace* Sourdille (*vide infra*), it is easily explainable by congenital atresia of one or more duct openings. One need hardly enquire further into the cause of such atresia.

Assuming that there may be a certain number of congenital cases, we may proceed to the cases which certainly are not congenital.

It is obvious that any cicatricial condition of the upper conjunctival fold, whether this be caused by trachoma, by a burn, or by suppuration due to injury or disease, might readily bring about an obliteration of one or more ducts. Such cases are among those which have been reported. But there have been cases in which it has been difficult or impossible to assume any such cause. In many of the reports no cause is known, and some of these cases have been put down as congenital, possibly correctly. Francke¹⁸ found that

his case was caused by cicatricial shrinkage. Not being able to account for this, he assumed that the duct had been blocked by a small foreign body, and that this had brought about ulceration and cicatrization.

From this idea of a localized cicatrization it is an easy step to the theory of Sourdille, for the views of whom I am indebted to zur Nedden.¹

Sourdille exhaustively studied a case, and investigated not only the wall of the cyst but also a part of the gland itself. From this it emerged that the fibrous wall of the cyst represented a greatly dilated duct of the gland into which several smaller, also dilated, ducts opened. The gland itself showed undoubted signs of chronic inflammation which could be followed up from the cellular infiltration around the excretory duct into the gland lobules themselves. In many places there was a quite recognisable atrophy of the gland lobules. There was no stoppage of the excretory duct. Sourdille holds that, according to the view of Lagrange, such stoppage of the duct cannot usually be held to be the cause of dacryops, because experimental investigations of mechanical closure of a gland duct show that what follows is always only an atrophy of the gland, never the formation of a cyst. Sourdille believes that an inflammation is necessary to the formation of a cyst. This inflammation calls forth a morbid change in the wall of the excretory duct and an increased secretion by the gland, so that, now, as the result of a plentiful secretion of tears, a dilatation of the weakened wall becomes possible.

I have already mentioned that zur Nedden himself added two cases to those on record. In both of these he was so unfortunate as to fail in obtaining a microscopic examination; in one case, which had occurred without known cause, the specimen was lost; while in the other, which was secondary to trachoma, the patient refused operation. Thus it happens that one of the authors who has been at most pains to investigate this rare condition is not able to help us from personal observation of the pathological changes. He is driven to the somewhat lame conclusion—and it is probably the only kind of conclusion to which we can come even now—that the reported cases fall into two groups. The first group includes cases which may be regarded as pure retention cysts. In these there is a simple stoppage, from one cause or another, of the excretory duct, and a damming back of the secretion, followed by dilatation of the wall of the duct. The second group takes in the cases in which, in accordance with the theory of Sourdille, there has been a catarrhal inflammation of the mucous membrane of the duct with consequent weakening of its wall, increased secretion, and dilatation. As zur Nedden remarks, the theory of Sourdille sounds quite plausible, and seems to serve for cases in which neither patient nor physician can account for the cyst formation.

Whether the cases of dacryops really fall into two such groups as those postulated by zur Nedden, or whether further microscopic investigations will bring them all under one definite ætiological classification, time alone will show. I may, however, point out that the ingenious theory of Sourdille is rather strongly supported by those cases already reported in which evidence of inflammation has been discovered in the tissue examined. For instance, in my own case such evidence of inflammation around the cyst wall was undoubted. In the case reported by Reuss in 1885, the cyst contained pus²⁹. In Gilbert's case (*loco citato*) there was an inflammatory exudate close under the epithelial lining of the cyst wall. In Welikanow's case (*loco citato*) the gland tissue was abundantly mixed with connective tissue. In Sourdille's own case not only were there signs of chronic inflammation around the duct and the gland, but even of atrophy of the gland structure. The cell masses of "altered" epithelial tissue described in my case seem to point in the same direction.

The Treatment of Dacryops.

Treatment can be summed up in a very few words. The most important point is that the skin must be respected. If an attempt be made to excise the tumour by the skin route a fistula is the probable result.

von Graefe's plan was to pass a suture through the anterior wall of the cyst and allow it to cut out.²¹

de Wecker ablated the anterior wall of the cyst. Doubtless, he attempted complete ablation and failed on account of the technical difficulty. Absolute cure resulted.³

Berry speaks of a case in which the cyst entirely disappeared after one puncture.²²

Arnold is reported to have been able to excise the cyst completely, in spite of the thinness of its wall.⁶

Rogman also was successful in the latter operation.²³

zur Nedden, in the one of his two cases which was operated, snared off the tumour with a ligature. Complete cure resulted.¹

In my own case, in which the anterior part of the cyst was removed, the patient has not been seen since he left the hospital. This is presumptive evidence of cure.

In conclusion, one may say, as zur Nedden indicated in 1903, that further work is necessary before the ætiology of dacryops can be placed on a satisfactory footing.

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ACTINOMYCOTIC MENINGITIS DUE TO SPHENOIDAL
SINUS SUPPURATION CAUSING DEATH
FOUR DAYS AFTER EXCISION OF RIGHT EYE.

EDGAR STEVENSON.

BY
AND

CHAS. A. ADAIR-DIGHTON.



Sphenoid Bone removed at post-mortem examination. Showing complete absence of posterior clinoid process and basal process of sphenoid due to actinomycotic suppuration. Sphenoidal sinuses were therefore in direct continuity with meninges. Superior surfaces of the sinuses were removed at post mortem examination as also orbital plate on right side.



Micro-photograph showing actinomycotic filaments in surface section of brain (high power).

ACTINOMYCOTIC MENINGITIS DUE TO SPHENOIDAL SINUS SUPPURATION, CAUSING DEATH FOUR DAYS AFTER EXCISION OF RIGHT EYE.

BY

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THE following case, which recently occurred under our charge at the Hospital here, contains so many points of interest, that it appears to us to be worth while reporting :

N. B——, age 62 years, blacksmith, in employ of a Shipping and Steamship Company, first attended the out-patients' department on March 16th, with a history of having been struck with a particle of burnt coke on the right eye on the previous day (March 15th). On examination, a very small sloughy ulcer was found, occupying the inferior and inner quadrant of the cornea of the right eye. The left eye showed an old corneal opacity, and V. = 6/12 (partly). The vision of the injured eye was not taken, owing to photophobia.

The patient was advised to come into hospital, but could not do so until March 20th, *i.e.*, four days after he was first seen. The ulcer was then much worse. He was ordered diphtheria anti-toxin injections and the usual treatment, but the ulcer continued to spread rapidly, and on a tube being inoculated, a pure culture of pneumococci was obtained. On March 23rd, a radial incision was made but with no effect, and in a few days the whole cornea was destroyed, the ulcer having shown itself to be of a quite unusual virulence.

Excision of the eye was performed on April 3rd, by the patient's own request, the condition being then the early stage of panophthalmitis. The patient stood the anæsthetic well, and when seen on the following morning (April 4th), was apparently perfectly well. He continued to all appearances in normal health, and made a good mid-day meal; when about 5 p.m. he complained of feeling cold, and at 6 p.m. he became drowsy and his temperature rose from normal to 102·6° F. We were sent for by the House Surgeon to see him, and on arrival at about 8 p.m., we found him to present a typical picture of acute purulent meningitis, which at the time we were forced to believe was probably the outcome of infection of pneumococcal origin from the eye. The patient got no better, continuing to run a high temperature, with remissions, until April 7th, when he died at 2 p.m., four days after excision of the eye, and eight days after admission to the Hospital.

Permission for a *post-mortem* examination was obtained, and the following were the conditions found :—

The vertex of brain showed an extensive exudation, almost completely covering it. The base showed purulent meningitis, the cisterna magna being completely filled with purulent exudation. Both optic nerves were, on macroscopic examination, perfectly healthy (since confirmed by microscopic examination). On further dissection, the sphenoidal sinus on the right side was found to be markedly diseased, devoid of periosteum and mucous membrane, and presenting all the signs of an old chronic suppurative lesion. The left sinus was comparatively healthy. As will be seen from the illustration, the whole posterior wall of the sphenoidal sinus was completely destroyed.

(in this case the basal process and post-clinoid processes of sphenoid bone), so that both sinuses communicated freely with base of brain. The optic nerves were in no intimate relation to the sinuses on either sides beyond the fact that, the sinuses extended back on either side under the optic chiasma and sella turcica, both of which were apparently healthy. The orbits contained no pus or signs of infection. On microscopic examination of surface sections of the brain, typical actinomycotic filaments were found, no other organism being present beyond one or two isolated pneumococci. These filaments occurred in large numbers and retained the stain in Gram's method. Their arrangement and appearance are well seen in the accompanying microphotograph.

Remarks.

Now this case shows many points of interest. First, we should state that, in spite of the warnings of the text-books, and of the traditions in which we have been brought up, we have always made a point of excising eyes in the early stages of panophthalmitis, *i.e.*, before swelling of the eyelids has set in. So far we have seen nothing to contra-indicate this proceeding, but this case certainly looked as if infection had occurred directly as the result of removal of a suppurating eye, in the absence of all symptoms of intra-nasal disease, and we had no other possible diagnosis to fall back upon. It was therefore, with great interest, and with some small measure of relief, that we found this condition of the sphenoid bone, and it occurs to us that some, at any rate, of the reported cases of suppurative meningitis following excision, may possibly have been due to undiscovered sphenoidal suppuration.

Another interesting point is the disposition of the sphenoidal sinuses, which are situated much further back than normal. Their posterior walls are abnormally thin, as the base of the necrosed portion measures only 5 mm. in thickness, whereas normally, the posterior wall is at least 8 mm. to 10 mm. in thickness. Also, in view of the present interest evinced in the relation of the optic nerves to the sphenoidal sinuses, the lack of relation in this case, is remarkable, as it is one in which some connection might have been expected. The optic chiasma was normal and showed no sign of the fact that the sella turcica formed the superior wall of the sinus.

Again, the organismal cause of the suppuration in them, can safely be ascribed to actinomyces. This is very rare, and although we have made a wide search of the literature on this point, we have only found one reference at all bearing on it. This reference is in Kyle's *Text-book on Diseases of the Nose and Throat*. Although Kyle does not actually say that sphenoidal suppuration can be caused by actinomyces, he says that ethmoidal suppuration may be, so it seems to us that if the one can be traced to it, so can the other. Logan Turner, in his exhaustive papers on the bacteriology of accessory sinus suppuration, makes no mention of actinomyces as the causal organism.

Yet again, as the causal organism of meningitis, it is very rare, and the only reference we have been able to find to it, is an article by Henry, in which, after an extensive search, he gives a report of twenty-five cases of cerebro-spinal meningitis due to it. He remarks that, in some cases at least, the fact of actinomyces being the causal organism was uncertain.

Now, it appears to us that the case may be explained as follows.—The patient suffered from a chronic sphenoidal suppuration, which, as long as he was able to get about and follow his occupation, did not cause him any

particular inconvenience, as the pus drained away satisfactorily (?) but when he was confined to bed, and lay mostly on his back for about a fortnight, the pus no longer drained away, but, owing to the position of the sinus, filled it. The right sinus was the one primarily infected, and it seems more than probable that the stagnation of pus caused the erosion of the thin inter-sinus wall, and consequent infection of the left sinus. This also became a mere receptacle or cistern for pus, owing to its inability to discharge into the nose, on account of the recumbent position of the patient. The pus, therefore, caused necrosis of the posterior wall of the sinus, and so infected the meninges by direct continuity. This mode of infection is illustrated by a case reported by Ortmann, of extra-dural abscess due to sphenoidal sinus suppuration. The rapidity of the process (fourteen days in our case) may be ascribed to the virulent osteoblastic action common to actinomyces.

It appears to us that this case contains a moral in the shape of a warning, *viz.*, that more attention should be paid to the condition of the accessory nasal sinuses in all cases where the patient is likely to be in bed and lying on his back for any length of time; and, further, that patients suffering from definite sphenoidal disease, should not be kept in bed a moment longer than is necessary. Looking back, we can recall a mysterious case of death after cataract extraction in a very healthy man, which was then certified as due to septic pneumonia, but in the absence of a *post-mortem* examination, and in the light of the present case, we wonder whether undiscovered sphenoidal suppuration may not have been the cause of death.

Finally, the aspects of the case from the Workmen's Compensation Act point of view are not without an interest of their own.

Our thanks are due to Dr. Ernest Glynn, for so kindly giving us his help in the examination of the optic nerves and brain in this case.

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VISUAL EFFICIENCY.

BY

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SENIOR SURGEON TO THE NEWCASTLE-ON-TYNE EYE INFIRMARY.

A PATIENT, whose visual acuity has been reduced in both eyes from 1 to $\frac{1}{5}$, has not suffered a loss of 50 per cent.; the vision that remains to him is much more important than the half that he has lost. The whole question resembles the well-known one in economics about the marginal value of a commodity. It will be my endeavour in this paper to give a formula that shall determine the value to the patient of his impaired eyesight in terms of a standard efficiency which we shall assume to be equal to 1. Several formulæ of this sort have been previously given, but I submit my formula in the hope that it

will be considered more simple and at the same time more reasonable than those heretofore published.

As is customary, the standard visual acuteness 1 (or $\frac{6}{6}$) is that which can just recognize an object subtending an angle of one minute, whereas the expressions '1 or '5 ($\frac{6}{60}$ or $\frac{6}{12}$) denote cases where the minimum visual angle is 10' or 2'. The reciprocals of the fractions denoting the visual acuteness always denote the minimum visual angles in minutes.

We must regard the *total efficiency* (T), as composed of two terms as suggested by Dr. Berry.

(1) The efficiency (e) of sight excluding the binocular element. This will depend directly on the ordinary expression used for visual acuity.

(2) The binocular element that will be denoted by B .

(1) *Determination of e .*—Let a denote the visual acuity of the better eye, and let b denote the visual acuity of the inferior eye, then A will denote the

average visual acuteness of the eyes if $A = \frac{a+b}{2}$.

Then we may say that $e = \frac{2A}{A+1}$.

For normally $e=1$, and we have agreed that e must not diminish so rapidly as A . Thus in the above case where the vision of each eye was '5,

both a and $b = '5$. $\therefore A = \frac{'5+'5}{2} = '5$, and $e = \frac{2 \times '5}{1'5} = '6$ or $\frac{2}{3}$.

(2) *Determination of the Binocular element B .*—The extent of the visual field with both eyes is about 180° , while with one eye it is about 150° ; there is, therefore, a loss of about $\frac{1}{3}$ of the visual field when one eye is blind. But we must remember that it is the peripheral part of the field that is lost, and this is in no way so valuable as the central part of the field which is seen much more acutely. Again the loss of binocular vision means the loss of a ready and accurate perception of the third dimension of space. This loss is not absolute, for by moving his head the patient can still though imperfectly judge the relative distance of objects. In addition to this should be added a slight loss from the fatigue of only using one eye, and from the risk of losing the one remaining eye. We may conclude then with Dr. Berry that the loss of efficiency due to all these factors may be reckoned as $\frac{1}{6}$ of the Total efficiency (T) in standard eyesight.

We may say then that in standard eyes $T = \frac{5}{6}e + \frac{1}{6}B$, for in such eyes T , e and B are each expressed by unity.

In abnormal eyes, however, B must vary as the visual efficiency of the eyes that I have denoted by e , and it must also diminish in the ratio of the inferior eye to the better eye, *i.e.*, $B = e \frac{b}{a}$; but we have agreed that in standard eyesight e must have the value 1, so we get the simple formula

$$T = \frac{1}{6}(5e + B) = \frac{e}{6}(5 + \frac{b}{a}) \text{ or } \frac{A}{3(A+1)}(5 + \frac{b}{a}).$$

Now it is clear that if the standard total efficiency is denoted by 100, and if the total efficiency (T') actually found in a given case be multiplied by 100, this value $100T'$ will represent the percentage efficiency in that case; and $100 - 100T'$ will represent the percentage loss of efficiency. Subjoined will be found the tables of the percentage losses of efficiency corresponding to the recognised standards of vision according to this formula.

Let us suppose the case of a patient with perfect sight, who from an accident suffers a diminution of visual acuteness in one eye to $\cdot 1$ and in the other to $\cdot 5$.

$$\text{Here } A = \frac{a+b}{2} = \frac{\cdot 5 + \cdot 1}{2} = \cdot 3$$

$$\therefore T = \frac{A}{3(A+1)} \cdot 5 + \frac{b}{a} = \frac{\cdot 3}{3(1\cdot 3)} (5 + \cdot 1) = \frac{1}{1\cdot 3} (\frac{2\cdot 6}{3}) = \frac{2}{3} \text{ or } \cdot 4.$$

The percentage efficiency is consequently 40, and the percentage loss is 60, as is shown in the table. I submit that these tables would be of practical use to insurance companies, as giving a fair compensation to any person who insured his eyesight for £100. In the above case he obviously should receive £60, and from the table it will be seen that the claim for the total loss of one eye, the other remaining perfect, is estimated as nearly £44 9s.

It is, of course, impossible to assess the amount of compensation accurately for each individual; for instance, a defect of sight that in a pitman would be negligible, would absolutely preclude a microscopist from doing any reliable work in his subject. But the nature of the patient's work is not the only subject that should be considered, and I must protest against the essential unfairness of the Compensation Act, which only takes account of the wage-earning capacity of the workman. A watchmaker, for instance, may lose the sight of one eye, yet if his remaining eye is perfect his wage-earning capacity may not be diminished, and then no compensation will be granted him; surely, however, he has a claim for the loss of binocular vision and for all its attendant disadvantages.

There is little chance of getting the Act altered now, but I think that two terms should enter into the assessment of compensation:—

(1) The loss of total efficiency, which we may denote by L .

(2) The loss of wage-earning capacity, which we may denote by W .

I think that a fair compensation would be given by making it depend upon $\frac{1}{3}$ of the former and $\frac{2}{3}$ of the latter ($\frac{1}{3} L + \frac{2}{3} W$.) In the case of a workman I think his claim should be assessed on the basis of his wages.

As an example, take the case of a workman who before his accident had good sight ($T=1$), and was earning twenty-seven shillings a week; but after his accident could only earn twelve shillings a week; in this case $W=27-12=15$. Further, let us suppose that the accident resulted in the loss of one eye, while the vision of the other eye was reduced to $\cdot 5$ or $\frac{1}{2}$. On referring to the table we see that his loss of efficiency is 66·6 per cent. or $\frac{2}{3}$. Consequently, we may take $L=\frac{2}{3}$ of $27=18$. Then I think that he could fairly claim $\frac{1}{3}$ of $18+\frac{2}{3}$ of $15=16$ shillings, according to the formula

$$C = \frac{1}{3} L + \frac{2}{3} W.$$

It seems to me that an Accident Insurance Company should pay such a client the sum of sixteen shillings a week for life; he will therefore obtain $16 + 12$ or twenty-eight shillings a week. It is only fair that the workman should insure himself sufficiently to obtain rather more than his previous wages, as a slight consolation for his loss of enjoyment. What proportion of this sum an employer should pay an injured workman is another matter.

I would suggest this scheme of a policy to Insurance Companies, as I think it would be favourably received by professional men.

TABLE I.
PERCENTAGE OF LOSS OF EFFICIENCY.

V = ||	$\frac{6}{6}$	$\frac{6}{9}$	$\frac{6}{12}$	$\frac{6}{18}$	$\frac{6}{24}$	$\frac{6}{36}$	$\frac{6}{60}$	$\frac{1}{60}$	O
$\frac{6}{6}$	0	14'14	21'43	28'8	32'69	36'55	39'68	43'64	44'4
$\frac{6}{9}$	14'14	20	29'39	38'8	43'69	48'53	52'43	57'34	58'3
$\frac{6}{12}$	21'43	29'39	33'3	44'4	50	55'5	60	65'5	66'6
$\frac{6}{18}$	28'8	38'8	44'4	50	56'72	63'3	68'54	74'93	76'2
$\frac{6}{24}$	32'69	43'69	50	56'72	60	67'43	73'19	80'13	81'48
$\frac{6}{36}$	36'55	48'53	55'5	63'3	67'43	71'43	78'04	85'73	87'18
$\frac{6}{60}$	39'68	52'43	60	68'54	73'19	78'04	81'81	90'51	92'06
$\frac{1}{60}$	43'64	57'34	65'5	74'93	80'13	85'73	90'51	96'72	98'63
O	44'4	58'3	66'6	76'2	81'48	87'18	92'06	98'63	100

TABLE II.
PERCENTAGE LOSS OF EFFICIENCY.

V = ||	1	9	8	7	6	5	4	3	2	1	0
1	0	4'19	8'42	12'70	17'04	21'43	25'88	30'40	35'00	39'68	44'4
9	4'19	5'26	9'81	14'40	19'05	23'75	28'51	33'3	38'23	43'21	48'28
8	8'42	9'81	11'1	16'07	21'08	26'14	31'25	36'42	41'6	46'98	52'38
7	12'70	14'40	16'07	17'65	23'09	28'57	34'10	39'68	45'32	51'02	56'79
6	17'04	19'05	21'08	23'09	25'00	31'00	37'04	43'10	49'21	55'35	61'54
5	21'43	23'75	26'14	28'57	31'00	33'3	40'00	46'6	53'3	60'00	66'6
4	25'88	28'51	31'25	34'10	37'04	40'00	42'86	50'31	57'69	65'00	73'3
3	30'40	33'3	36'42	39'68	43'10	46'6	50'31	53'85	62'2	68'52	78'26
2	35'00	38'23	41'6	45'32	49'21	53'3	57'69	62'2	66'6	76'09	84'84
1	39'68	43'21	46'98	51'02	55'35	60'00	65'00	68'52	76'09	81'81	92'06
0	44'4	48'28	52'38	56'79	61'54	66'6	73'3	78'26	84'84	92'06	100

AN ANSWER TO CERTAIN OBSERVATIONS THAT HAVE BEEN MADE ON THE SUBJECT OF THE OPERATION OF TREPHINING FOR THE RELIEF OF GLAUCOMATOUS CONDITIONS.

BY

MAJOR R. H. ELLIOT, M.D., F.R.C.S.,

I.M.S., MADRAS, INDIA.

IN a communication read before the Ophthalmological Society of the United Kingdom, on May 5th, 1910, Lieutenant-Colonel Herbert drew a distinction between "filtering cicatrices" and "subconjunctival fistulæ." His comparison was very much to the disadvantage of the latter. After speaking of the marked lowering of ocular tension found shortly after operation in eyes in which subconjunctival fistulæ had been established, he suggested a "risk to the eye" from this condition, and drew the inference that eyes which had been trephined lay between the danger of overlowering of tension, on the one hand, and that of blockage of the trephine hole by uveal tissue, on the other.

I desire to offer an answer to these criticisms from both the theoretical and the experimental standpoints.

To begin with, what anatomical evidence is forthcoming that there is any essential difference between the two conditions to which Lt.-Col. Herbert has referred? E. Treacher Collins raised this question at the meeting, and said that "he had cut many sections of eyes which had been operated on for glaucoma, and he could not recall any condition which would correspond to Lt.-Col. Herbert's filtration scar as distinct from a gap in the sclero-corneal tissue." Lt.-Col. Herbert admitted that "the distinction between a filtering cicatrix and a fistulous scar was at present purely clinical." If a real difference does exist, will not the result be so much the worse for the filtering scar? I submit that although we are familiar with fistulæ in many parts of the body, there is nowhere to be found a permanent condition such as Lt.-Col. Herbert assumes to be present in the eye. The teaching of pathology, surely, is that such a scar will be bound to continue contracting until filtration through its meshes is no longer possible. In the absence of anatomical proof to the contrary, I think we are more logical if we assume that in all those cases in which long-continued transudation of fluid takes place from within the eye to the subconjunctival space, we have to do with permanent fistula. The fact that during life we are unable to demonstrate these fistulæ is surely no valid argument against their existence. It is possible that in such cases a number of tiny *fistulettes* are present, which, although very small, are none the less capable of efficiently acting as conduits for the carriage of the necessary volume of fluid. If that be so (and an anatomical examination alone can settle the question), then the so-called filtering scar differs only in detail from the single large fistula produced by trephining.

We come next to the question of the dangers of lowered tension. I must confess that I was at first alarmed at the very low tension sometimes met with during the few days following operation. My own fear was that it might lead to detachment of the retina or to hæmorrhage, and I presume that these are the dangerous conditions which loom before the minds of critics.

Of the question of hæmorrhage I may dispose at once. We have performed 370 trephinings in this clinic during the last 19½ months (March, 1911), and have not met with a single instance of expulsive hæmorrhage during the after-course of a case. The question of hæmorrhage occurring during the operation,

and consequent on the sudden lowering of the tension of the eye, is an entirely different proposition. I hope to deal with that question elsewhere. It is a risk common to all procedures in which the eyeball is opened when in a glaucomatous condition, and is in no way peculiar to trephining. Indeed, I hope to show that the evidence is in the other direction and in favour of trephining rather than adverse to it. This absence of hæmorrhage as a complication of our operations is the more noteworthy since we have dealt with many eyes at a stage, which, I understand, they rarely reach in European clinics.

Detachment of the retina or of the choroid remains. It is my practice to interfere as little as possible with eyes during convalescence after operation, as I think more danger arises to the patient thereby than is compensated for by the benefits of the more accurate knowledge thus obtained of the steps of his convalescence. Practically, therefore, I never examine these cases with the ophthalmoscope until they have recovered, and it is possible that slight detachments may have been overlooked. On the other hand, the visual results in cases which have returned for examination have been good, and, still more to the point, the vision even before discharge has shown a distinct improvement in a large number of our cases when compared with that before operation. In the great majority one can confidently say that the patients have left hospital with vision as good as or better than they came in with; often the improvement in the sight has been very marked. One more point. In the majority of our cases the tension, low as it at first may be, gradually goes back to normal or near it. Would this happen if serious detachment had occurred? I think not.

In a few of those cases in which trephining had been undertaken for the relief of pain and congestion in blind painful eyeballs, it has been noticed that the tension remained permanently very low, but this is obviously a matter of no consequence so long as pain and congestion are relieved. Without being prepared to say that the great lowering of tension is devoid of danger, one can at least congratulate oneself that one's fears that it would lead to retinal detachment have so far not been realised, and that too in spite of every opportunity having been afforded for the proof. I think it possible that others have argued like myself that inasmuch as we frequently meet with detachment of the retina as the cause of low tension in an eye, therefore low tension is necessarily a dangerous factor from the point of view of the ophthalmologist. If that be the view others have taken, I wish to submit that we have probably been misled by a reversal of ideas. We know very little of the mechanism of retinal detachment; and, indeed, even the forces which maintain the retina in position are under dispute. It is therefore unsafe to dogmatise on the results of lowered tension until we have clinical proof that it really does produce the evils we feared for it.

I have under my observation a gentleman on whom I performed the operation of double trephining (both eyes at one sitting) early in September, 1910. He has since been continuously under the care of a medical man who himself does a large eye-practice, and who sent the patient to me in the first instance. It has thus been possible to observe the progress of the case closely. Recently, when I saw the patient, 6½ months after the operation, the tension of the eyes was 10 mm. and 5 mm. of Hg. respectively (by the Schiötz tonometer); these readings were in accordance with the medical man's report of continuously lowered tension; filtration through both trephine holes was *very* free; vision and fields remained practically in *statu quo antea*: a very careful examination of his fundus under a mydriatic failed to reveal anything abnormal, beyond a slight fulness of the veins; yet this was the very type of case in which

detachment might have been feared, had one argued from *a priori* grounds alone. The patient has resumed his work as an educational officer.

We come next to the question of the blockage of the trephine holes with uveal tissue. Experience has clearly shown that the tendency to this complication varies very greatly in different cases. This is a large subject and one into which we cannot fully enter now. For the present we must confine ourselves to dealing with the clinical elements of it alone. For this purpose we may divide all cases which come under the trephine operation into two classes: those in which the iris falls back into the chamber as soon as aqueous has escaped, and those in which it shows a more or less troublesome tendency to fill up our trephine hole. The former and much larger class does not concern the argument. The latter class, of course, does; but, and this is a point I wish to emphasise, if the operation has been a simple trephining made as I have advocated as close to the cornea as possible, the only part of the uveal tract with which we have to deal is the iris, and the offending portion can in most cases be easily excised, thereby greatly reducing the danger. If this tendency to iris prolapse exists in any case, I venture to doubt whether Colonel Herbert's operation will be any safer than my own. Iris tissue will be pushed into the gap whatever form that gap takes. I do not think that this can be seriously disputed. If an operator's incision lies over the ciliary body, then he is worse off than I am and not better.

It may be claimed that the smaller aperture entails less danger of iris prolapse. On this point I have some evidence to offer. When trying various sizes of trephines, it was found that if the aperture was reduced below 2 mm. one was liable to have trouble with the iris in the wound; the tendency for it to get caught there was greatly increased. This appeared to be due to the difficulty of handling the iris through so small an aperture; there was not room to work properly with the forceps, and it was not possible to be sure of a neat excision of prolapsed iris with a clean return of the portion which filled the trephine hole. The argument against trephine holes as a class based on their size is, therefore, I think, a fallacious one: for the smallest holes are, for the reason given above, the ones in which iris prolapse are most to be feared. On the other hand, I have quite recently removed a disc, 3.5 mm. in diameter, from near the limbus of a patient in whom two previous trephinations with a 2 mm. trephine failed to keep the tension down permanently. The cause of failure of the two previous operations appeared to be the strong tendency towards matting down of the conjunctiva on to the sclera, owing to the long-continued, sub-acute inflammatory condition which had prevailed. It was thought that if we made a large trephine aperture we might be able to keep the filtration of fluid sufficiently free. Uveal tissue was freely excised. My present point is that there has been no tendency for the uveal coat to bulge into the wound, and incidentally I may mention that in this case it looks as if we were going to be successful in keeping the drain open at last.

I have no wish to labour my argument, which, shortly stated, is as follows.—

(1) The tendency to iris prolapse in cases of sclerectomy is dependent in the main on factors other than the size of the aperture made through the coats of the eye, and (2) if the aperture through which we work is reduced below a certain size, then the difficulty of dealing with any iris which may prolapse, or which it may be thought necessary to excise, is so great that the operation is needlessly complicated; the danger of iris impaction then increases rather than decreases. The shape of the wound will not influence this tendency nearly so much as its size.

CLINICAL MEMORANDA.

NOTE ON BIFOCAL GLASSES

BY

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SO GREAT is the convenience of bifocals that they should, if possible, come into universal use whenever both the far and near correction are necessary. Yet it is a matter of common observation that while some patients take at once to their bifocals, with evident satisfaction, others experience a rather stormy introduction to their use, and many are obliged to abandon the attempt to wear them owing to the "irritating effect," as they call it, of the upper margin of the reading segment.

The following little expedient, I find, contributes towards the education of those who cannot at once become reconciled to the presence of the dividing line. It consists in painting a black line at least one millimetre broad on the posterior surface of the glasses, along the upper edge of the reading segment. Indian ink, mixed with gum or "Seccotine," which can be easily washed off when required, affords a very suitable pigment. The mind being kept conscious of the presence of this band, finds less difficulty in learning to look either above or below it, and when the lesson is well learnt, the band can be washed off.

The irritating effect of the dividing line is due partly to the double vision from the prismatic action of the edge of the reading segment, and partly also to scattered light, to which some eyes are so much more sensitive than others, and which acts much as a nebula upon the cornea would do. A black band is far more soothing, and if painted truly, is not nearly so unsightly as might be anticipated. It has indeed rather a purposeful look.

As distinct from this educational band I think it would be well to make a practice of staining the margin of the reading segment with a dead black in all cases, and even in the uni-bifocals the lower edge of the larger segment should be thus stained, so as to lessen adventitious reflections into the eye. Since the stained margin looks upward or downward, it would not be sufficiently visible from the front to counterbalance its advantage to at least those who have some retinal hyperæsthesia.

In any case, however, bifocals are a greater trial to active-minded neurasthenics than to patients of the phlegmatic and eupeptic types.

ACUTE DACRYOCYSTITIS DUE TO THE PNEUMOCOCCUS IN A CHILD SEVEN YEARS OF AGE.

BY

W. DUNCAN LAWRIE, M.D., F.R.C.S., ED.

OLDHAM, ENGLAND.

ISABELLA N—, aged 7 years. This child with her two sisters has adenoids and enlarged tonsils. One sister has had a corneal ulcer, and the other an otitis media, but the patient herself has had no previous illnesses of importance.

In the present attack the mother first noticed that the right eye looked red and inflamed, it watered very much, and there was some "matter" in the

inner angle. There was some blood-stained nasal discharge at this stage, which became purulent later. The lymphatic glands behind the angles of the lower jaw became swollen. After this condition had continued for two or three days, there was swelling and discolouration of the lower lid and cheek, and the child was brought to me.

I found the condition as follows :—

There was considerable œdema of the right lower eyelid and cheek, with some bluish discolouration. The right lacrymal sac was tense; its walls were apparently thickened and tender to touch. On pressure a mere trace of milky pus regurgitated through the canaliculi.

The glands behind the angle of the lower jaw on the right side were enlarged; one was the size of a pigeon's egg, and another that of a small marble. Behind the angle of the left lower jaw there was a gland about the size of a marble.

Examination of nose and throat showed nothing beyond enlarged tonsils, which were not actively inflamed. There was no pus in the nose, but the mother said she had carefully cleansed it all out before coming for examination, and that there was a constant discharge of pus.

Examination of the pus microscopically showed numbers of pneumococci.

The condition lasted about ten days and then subsided, and there is now no trace of the lacrymal sac or of the enlarged glands.

Treatment.—This was simply expectant. Boracic lotion was used to bathe the eyelids. No attempt was made to syringe out the sac, as the child very emphatically resented anything at all painful.

NOVELTIES.

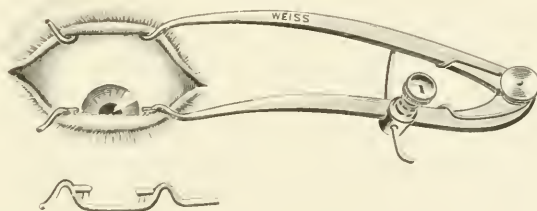
FIXATION SPECULUM.

BY

W. H. BRAILEY, M.A., M.D. (Cantab.)

HOVE, SUSSEX.

THE "Fixation Speculum" was designed to obviate the difficulty which is experienced in fixing the eye while performing such operations as cataract extraction or iridectomy, owing to the tendency of the ordinary fixation



forceps to cut out. It also does away with any need of an assistant, with the consequent risk of undue pressure on the eye and gaping of the wound.

The "Fixation Speculum" consists of a speculum of the pattern most favoured by the surgeon, with the addition of two arms on the lower blade, each bearing two rounded spikes.

To insert this speculum, the upper blade is first put into place under the lid, the points of the spikes on the lower blade are next pressed against the conjunctiva, close to the corneo-scleral junction on either side of the cornea; the other blade is now put into position behind the lower lid, so rotating the eye down and fixing it in the position most favourable for operation.

In the operation for cataract, the fixation forceps can be entirely dispensed with, or may be used to give additional security.

In performing an ordinary iridectomy, the fixation forceps are used to exert pressure upwards, against the downward pressure of the keratome: when the incision has been made, the fixation forceps can be confidently laid aside and both hands of the surgeon are left free to complete the operation.

Owing to there being four separate rounded spikes holding the conjunctiva, I find that it is practically impossible for them to cut out: the direction of pull of the lower blade being tangential to the globe, it is impossible for any pressure to be put on the globe, so causing the wound to gape.

In very nervous patients it has the additional advantage of getting the patient accustomed to the eye being fixed in position before the operation commences. I have found that patients then gain confidence and the surgeon need not commence until the patient is quiet.

The speculum can be removed as quickly and easily as the ordinary pattern, it being immaterial which blade is removed first. The points must be kept well sharpened.

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REVIEW.

ON SYMPATHETIC OPHTHALMIA.

BY

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IN the whole realm of pathology there is no condition which can be regarded as a strict parallel with sympathetic ophthalmia. Small wonder, then, that this curious disease has attracted so many researchers, and given rise to so many theories.

Parsons¹ states that the first reference to the disease was made in a German text-book of ophthalmology by Bartsch in 1583, but it was not until 1835 that it was fully described by one of our own countrymen, the famous William Mackenzie, of Glasgow.

Since then much has been written on the subject. In this Review it is my intention to examine the more recent work, but to make no attempt to pass all the existing literature in review. The story of sympathetic ophthalmia is not yet finished, for several important points still await solution and no stone must be left unturned in order to fathom the mystery of this disease, which is one of the worst that can afflict the human eye.

It is fitting to consider here the nomenclature of this disease. Many medical terms require revision, as our knowledge increases and the true basis of work becomes a pathological one. The term "sympathetic" no longer holds good. The sympathetic nerves are certainly not concerned in the affection,

and we cannot rightly affirm that any organ can be diseased out of sympathy with its fellow. "Ophthalmia" and "ophthalmitis," too, are incorrect terms, for we know the limitations of the pathological process and all the structures do not take part directly. Such terms as "metastatic" and "migratory ophthalmia" are also inadequate. It will be shown later that we can affirm this much. The condition is one of uveal inflammation, characterised by a definite histological lesion, due, no doubt, to a specific organism, and, when once established in one eye, it is capable of developing on similar lines in the other eye. No doubt, in time a suitable and adequate term will be forthcoming.

Just a word as to the terms commonly in use. The primarily affected eye is known to us in England as the "exciting" eye, and the secondarily affected one as the "sympathising" eye. Unfortunately, on the Continent of Europe this is not so. A note of this is made in several of the modern text-books, and it has been specially insisted upon by Gifford, of Omaha, but I may be pardoned for once more pointing this out. The exciting eye is called the "sympathising" eye (*sympathisierende*, *sympathisant*, *simpatizzante*), and the secondarily affected eye is called the "sympathised" eye (*sympathisierte*, *sympathisé*, *simpatizzato*) in German, French, and Italian respectively. The importance of bearing these terms in mind when consulting foreign literature is obvious. Throughout this Review I shall, of course, retain the terms used in England, to which we have just claim, seeing they were the ones originally employed by Mackenzie.

Sympathetic Irritation.

In text-book descriptions this condition is always associated with that of sympathetic inflammation. It is necessary to have a correct understanding with regard to the relationship of one condition to the other.

Most people have experienced the effect of getting a foreign body in one eye and of finding that the other participates in the irritation produced. A foreign body on the cornea or under the upper lid will affect that eye by irritating the terminations of the fifth cranial nerve in the cornea and conjunctiva which are for the most part concerned with the sense of pain. This sets up a reflex which results in a flow of tears, spasm of lids, etc. If the irritant is not removed, the reflex crosses to the other side and a similar state of affairs comes about in the fellow eye. But the reflex may overflow still further, and I have known of a case where the whole of the body was thrown into convulsions by the pain and irritation of a foreign body beneath the upper lid. No one doubts that we have here a pure example of a complex reflex affecting the other eye without any pathological changes. We know, too, that in cases of keratitis, iritis, etc., a similar reflex condition can be brought about in the other eye. It is not surprising, then, that an injured eye may also give rise to such a reflex. This may occur some time after the injury and especially in those eyes which have gone on to phthisis bulbi. To this condition the term "sympathetic irritation" has been applied. It manifests itself by such symptoms as photophobia, blepharospasm, lachrymation, and retinal and accommodative asthenopia. It is a *sine qua non* that no true evidence of inflammation be present; otherwise, we are not dealing with a genuine sympathetic irritation. From this it may be seen that a case of sympathetic irritation may be followed immediately by sympathetic inflammation or the condition from the start may be sympathetic inflammation difficult to diagnose until definite inflammatory signs appear. It is not to be wondered at that a good deal of controversy has centred around this condition, and one can divide the contestants

into two groups, *viz.*, (*a*) those who maintain that sympathetic irritation is a true reflex neurosis and quite independent of sympathetic inflammation; and (*b*) those who maintain that sympathetic irritation is associated with and is part of the condition called sympathetic inflammation.

Swanzy² holds that the condition is a true fifth nerve reflex neurosis and distinct from sympathetic inflammation, although it may precede it. It is no indication one way or the other as regards prophylactic enucleation. Lawson³ has expressed similar views. Burnham⁴, however, was of opinion that sympathetic irritation and sympathetic inflammation were of similar origin, whatever it might be. Oliver⁵ regarded sympathetic irritation and sympathetic inflammation as simply different stages of "transferred ophthalmia." Péchin⁶ believes that we should not accept the theory of neurosis. He thinks retro-bulbar neuritis may be present, and give rise to the symptoms of sympathetic irritation. It is noteworthy that Fuchs⁷ in his series of 200 cases to be referred to later, found no characteristic histological lesions in sixteen eyes which had been removed on account of sympathetic irritation. Parsons¹ quotes the postulates laid down by Schirmer which should hold good if sympathetic irritation is related to sympathetic inflammation. They are as follows.—(1) All diseases of the exciting eye which give rise to one type should also give rise to the other. (2) Every sympathetic irritation of long duration or great intensity should gradually pass into sympathetic inflammation. (3) Every sympathetic inflammation should be preceded by a stage of sympathetic irritation. This is not the case.

Parsons¹ is of opinion that so-called sympathetic irritation is a symptom-complex of two-fold significance. In the majority of cases it is a purely reflex phenomenon. On the other hand, the early signs of true sympathetic ophthalmia may—although they rarely do—simulate sympathetic irritation.

This seems to me to be a rational view and one with which I entirely agree. Just as removal of a foreign body, the cure of iritis, etc., remove the reflex effect on the healthy eye, so enucleation of the exciting eye always cures sympathetic irritation. If a true sympathetic irritation exists, as many believe it does, and if it is independent of sympathetic inflammation, which may follow it, as many believe also, then Swanzy is right in saying, as above, that it is no indication one way or the other for prophylactic enucleation. It is this doubt about the relationship between sympathetic irritation and sympathetic inflammation that has led to the hasty removal of many eyes which might never have caused sympathetic inflammation and which might have become useful organs of vision. Every surgeon has his own ideas on this subject, and each case will have to be judged upon its own merits.

Sympathetic Ophthalmia.

This disease is an inflammatory condition attacking the uveal portion of the eye. There is nothing about it that can be regarded, from a clinical point of view, as pathognomonic, its features being similar to other forms of uveitis. It is only by careful consideration of the aetiology that we can arrive at a correct diagnosis, and there will always be cases which must remain doubtful.

Parsons¹ has written up this part of the subject so fully that I make no apology for quoting freely from his book.

Ætiology.

Frequency.—It seems impossible to arrive at anything definite on this point. Most authorities who have studied the subject are forced to conclude that the

condition belongs to the rarer diseases of the eye, and that during recent years there has been a progressive diminution in the number of cases. If the condition is of bacteriological origin, this would naturally be expected, owing to the advance in antiseptics and asepsis. Statistics can never be accurate, because a large number of eyes are being constantly removed where we are unable to say whether sympathetic ophthalmia would or would not have definitely occurred in the other eye. Now that we know more of the pathology of the condition, all eyes excised for fear of sympathetic ophthalmia should be examined and the condition recorded. Some trustworthy information might be gathered in this way. I quote the following figures from Parsons⁽¹⁾

Author.	No. of Patients.	Total cases of sympathetic ophthalmia.	Percentage.
Mooren	108,416	146	·134
Becker	12,365 (in-patients)	18	·15
Treacher Collins	10,676 (in-patients, 1884-88)	97	·9
" "	10,095 (in-patients, 1889-93)	62	·61
" "	10,366 (in-patients, 1894-98)	47	·43

Treacher Collins's figures at least bring out the point of diminution of cases, for (as Parsons points out) such cases being severe, will be treated as in-patients.

Weigelin⁸ went into the frequency of occurrence after injuries to the eye. Fuchs, from a collection of 181 eyes removed later than 14 days after injury, found his typical lesion in 24 cases, or 13 per cent. Weigelin, from a larger collection, came to the conclusion that it should be about 8 per cent. Schirmer found three cases amongst 157 infected wounded eyes, or two per cent. Kitamura amongst 577 cases of perforating wounds, found 17 cases, or 2.94 per cent. Weigelin then examined a large collection of recorded cases of perforating wounds of the globe, but he excluded all cases of sympathetic ophthalmia following operations and perforating ulcers. Out of a total of 1,150 such cases, there were only 12 in which sympathetic inflammation occurred, or 1 per cent. But he points out that the percentage would be higher if we knew what number were capable of giving rise to sympathetic inflammation, and those eyes which through early removal prevented its occurrence. Woodruff⁹ emphasises the fact that it is a rare disease, and states that from 1859 to 1906 there were 108 cases amongst 199,454 patients, or 0.054 per cent.

Sex.—Men are more frequently affected than women, but, then, they are naturally more exposed to injuries.

Age.—Children seem to be more prone to be attacked by this disease than adults. This has been pointed out by Woodruff⁹ who is in agreement with Schirmer in attributing it to the greater frequency of perforating wounds of the eye amongst children. Parsons¹, however, believes that children are really more predisposed.

Seasonal variation.—Brailley found 39 cases in summer to 13 in winter, and Weber 13 in spring to 6 in winter. These figures do not help us much. It should be possible to obtain more extensive statistics on the subject. Of course, the late onset of the disease in some cases renders any accuracy difficult.

Perforations of the globe.—From the first *perforating wounds* have always been regarded of the utmost importance as a cause of sympathetic ophthalmia. That this disease frequently follows wounds of the globe has been shown above. There is, as a rule, some complication in the healing, such as incarceration of the iris, lens capsule, or ciliary body, or the presence in the eye of a foreign body. In these cases the healing of the wound is slow, and there is

more than ordinary reaction. Should the eye go on to suppuration, the likelihood of sympathetic ophthalmia supervening is greatly reduced. A few such cases have been recorded, but it is believed that the pyogenic organisms, as a rule, inhibit or destroy the special organisms causing sympathetic disease. Wounds of the ciliary region have always been regarded as perilous, and this part of the eyeball is therefore generally known as the "dangerous zone." Here there is great liability to prolapse and incarceration of uveal tissue, but if the wound is aseptic, there is probably no greater risk here than elsewhere. Trousseau¹⁰ has pointed out that the application of the galvano-cautery to herniæ of the iris is apt to be followed by sympathetic disease. He has met with five such cases.

Foreign Bodies.—Foreign bodies in the globe also have always been regarded as highly dangerous, especially if they cannot be removed. From a bacteriological point of view, if they are aseptic, there should be no risk. That foreign bodies can be retained in the eye for some time without causing sympathetic disease there is no doubt, but the general practice of removing the eye when the foreign body cannot be extracted, is a very sound one, especially if the sight is at all seriously affected. Those who have seen the devastation caused by sympathetic ophthalmia have no desire to run undue risks either for their patients' or their own sakes.

Operation Wounds.—Operation wounds are no less exempt than other wounds, except that, of course, every precaution is taken to prevent infection from without. Still, now and again, cataract extraction is followed by sympathetic ophthalmia. These cases will be found, as a rule, to be complicated by loss of vitreous, prolapse and incarceration of iris, and iritis and irido-cyclitis, with prolongation of healing. Over one hundred cases are on record, although surgeons naturally shrink from publishing their failures. It is, therefore, impossible to gauge the frequency of this accident, especially as such cases frequently get into the hands of another surgeon. One of the worst cases of sympathetic disease I have ever seen followed discission of a congenital cataract.—The lens became dislocated, and caused an acute glaucoma. On removal, there was no loss of vitreous, but some iris became incarcerated in the wound. This was removed a few days later. An extremely violent attack of sympathetic ophthalmia supervened in a few weeks, and led to almost complete blindness in both eyes, in spite of everything that could be done in the way of treatment. No doubt, defective *technique* may be an important factor, but the best of operators, with every care, may occasionally lose a case through this disease.

Recently, attention has been called to the danger of Mules's operation. The advantage of evisceration, especially when an artificial vitreous (glass, metal, etc.) has been introduced, is the better stump for the artificial eye, and, consequently, the enhanced æsthetic effect.

Is there any additional risk attached to this operation and, if so, are we justified in running it? I have experience of it only in cases where the globe was enlarged from buphthalmos or old staphyloma and where the eye was entirely free from inflammation. There should be no risk in such eyes, but where the eye is acutely inflamed and suffering from the effects of injury, it may be quite another matter. Gifford¹¹ had a case of sympathetic ophthalmia after performing Mules's operation on an eye which had received a perforating wound of the sclera. The operation was done three months after the injury, a glass ball being inserted through the sclera, the cornea being preserved. Seven months later, the patient returned with the other eye inflamed. There was no evidence of irritation in the injured eye. Recovery of almost normal vision was obtained after active treatment, but sight was subsequently lost

from glaucoma of unusual type. Gifford, much impressed by this case, examined the literature for other records with the following result:

Cases of sympathetic ophthalmia after Mules's operation 16

"	"	"	"	"	evisceration	9
"	"	"	"	"	Frost's operation	3

With regard to the severity of the disease in those cases where vision was recorded it was as follows: After Mules's operation: $V.=\frac{2}{3}$ or better in nine: in two $\frac{1}{2}$ and $\frac{1}{4}$ respectively; and in two the sight was nearly destroyed. After evisceration: $V.$ in two was normal; in one $\frac{6}{10}$; and in 3 cases the sight was lost. After Frost's operation: $V.=6/10$ in one and fingers at 4 feet in another. Gifford is in favour of enucleation.

Byers¹² has recorded a case of sympathetic ophthalmia following two weeks after Mules's operation. The operation was performed 40 days after the injury to the eye. The inflammation was quite typical, but the patient made a complete recovery with $6/6$ vision.

Brobst¹³ had a case occurring 59 days' after Mules's operation. There was complete recovery in 164 days with $V.=6/6$. The stump, which was inflamed, was excised, and cyanide of mercury injected into the optic nerve.

Oliver¹⁴ also has recorded a case in which the stump was tender. It was examined after excision. There was no uveal tissue left. The sheath and nerve were infiltrated and the sheath spaces and central artery were plugged with mononuclear leucocytes. No bacteria were found in the stump, but from the sheath one string of small oval cocci, stained by Gram, was discovered.

What importance are we to attach to these cases? We know that sympathetic disease sometimes follows enucleation, and therefore that it may, of course, follow evisceration and its modifications. To prove that evisceration is not as safe as enucleation, we must show that more cases of sympathetic ophthalmia follow this operation than enucleation, and for this we require extensive statistics, which, however, are not available. It has been shown, as I shall mention later, that in some instances of sympathetic disease the optic nerve is involved, so that it would be better that some of the optic nerve should be removed as well, as indeed is done when the eye is excised. In all these cases the possibility of infection of the other eye before operation must be borne in mind. On the whole, it would be better to perform enucleation rather than to run any additional risk.

That sympathetic ophthalmia can attack the second eye even after enucleation of the first eye is now an established fact, so that enucleation cannot be regarded as a certain preventive.

Parsons¹ says iridocyclitis cannot be regarded as of sympathetic origin unless the disease sets in within five weeks of excision of the exciting eye. But Cecil Shaw¹¹ has recorded a case forty-seven days after enucleation, and Sydney Stephenson¹⁵ one fifty-four days after removal of the injured eye, so that we cannot place a safe limit of time, although, as far as I know, Stephenson's case is the latest recorded to have occurred. Rowan and Sutherland²² have recorded a case of sympathetic neuritis which arose a year after enucleation. From the clinical history there is some evidence, however, that this eye was affected, though but slightly, some time before enucleation. This case will be referred to again shortly.

The Committee of the Ophthalmological Society¹⁸ collected thirty authentic cases following enucleation. In eighteen recovery occurred, in three recovery was more or less complete, and in nine the eye was lost.

On the whole, the condition is believed to be less severe if it sets in after enucleation of the injured eye.

Sympathetic ophthalmia rarely follows *perforation of a corneal ulcer*. Gunn, however, has recorded such a case.

Can sympathetic disease occur without perforation of the globe?—Definite cases have been recorded where irido-cyclitis has arisen in an eye affected by an intra-ocular malignant growth and an irido-cyclitis has developed subsequently in the other eye. In some of the cases there has been no perforation of the globe, and therefore no communication with the external parts, so that any infection from without has been impossible. Most of the cases have been sarcoma of the choroid, but there have also been a few instances of glioma of the retina. Some have given rise to sympathetic irritation. Plastic inflammation of the uveal tract is present in the exciting eye. The pathology will be dealt with later. Parsons¹ states that he agrees with Leber and Krahnstöver that there is not sufficient evidence to show that sympathetic ophthalmia is ever set up by sarcoma of the choroid itself, even if the growth perforates the globe.

Meller¹⁵ has investigated the relationship between intra-ocular sarcoma and sympathetic inflammation. He gives in detail a case of a man suffering from intra-ocular sarcoma, who had an irido-cyclitis in both eyes. The sarcomatous eye was removed and submitted to a very careful histological examination. In this, besides the sarcoma, he found typical foci of the infiltration described by Fuchs as characteristic of sympathetic disease (see later). The tumour had not communicated with the exterior, and so the eye could not have been infected from without. All causes of irido-cyclitis were wanting. If the peculiar foci of infiltration described by Fuchs are absolutely characteristic of sympathetic ophthalmia, and they were undoubtedly present in Meller's case, then we shall have to accept the point as proved and acknowledge the possibility of sympathetic disease arising in relation to intra-ocular growth. What that relationship is will be considered later.

Injuries to the eye which do not produce an open wound have also been recorded as causing sympathetic ophthalmia. Amongst these must be mentioned subconjunctival rupture of the globe and in these the lens may be dislocated too. Several cases are on record, some being of doubtful nature. Parsons¹ feels that he cannot accept the view that the uveitis set up produces sympathetic ophthalmia, seeing the extreme frequency of incarceration of the iris or ciliary body or both in subconjunctival rupture of the globe. "The presence of a minute wound of the conjunctiva or of an abrasion through which exogenous infection might take place most probably explains the few doubtful cases in which true sympathetic ophthalmia may have occurred. Otherwise the injury is probably innocuous from this point of view." It is a question of exogenous *versus* endogenous infection, a matter of the utmost importance to be considered later. Roure¹⁶ considers that *dislocated lenses* may give rise to sympathetic ophthalmia by irritating the iris. They should therefore be removed. He has found two such cases recorded, and gives four of his own in support of this view.

We come now to the interesting point as to what may be *the interval between the injury of the exciting eye and the development of sympathetic inflammation in the second eye*. This may be anything from 14 days to 40 years. Fuchs¹⁷ gives the tenth day as the earliest recorded.

Of course, the whole question is one of accurate diagnosis and all other causes of uveitis should be excluded. Such a diagnosis is more certain the sooner it is made after the injury. According to the information obtained by the Committee of the Ophthalmological Society of the United Kingdom¹⁸, out of 200 cases 170 occurred after 4 weeks and before the end of the first year, 18 within four weeks, and 12 later than a year.

Gunn¹⁹ has shown that the most dangerous period is from 6 to 12 weeks. With regard to the extreme limit, a few cases have been reported as occurring after 40 years. It is usual for the exciting eye to show some signs of inflammation prior to the onset of sympathetic disease in the other eye. For this reason any old injured eye or case of phthisis bulbi which becomes red and tender, should certainly be excised.

Stieren²⁰ has stated that he regards eyes, in which a plastic uveitis has ended in osseous degeneration, as dangerous ones. Parsons¹, however, does not consider ossification in itself as of any special danger.

We do not know whether injury, even when trivial, to old injured and atrophic eyes may not be a factor in starting sympathetic disease many years after the original injury.

Clinical Manifestations.

As stated above, there is nothing pathognomonic about the clinical manifestations of sympathetic disease. It is not my intention to go into the clinical signs and symptoms of uveitis, but I shall mention a few points.

The *onset* may be quite insidious. le Roux²¹ has recorded two cases occurring in children after wounds. There was no pain or inflammation of either eye in each case, so that the disease was not discovered until a late stage. One of the earliest signs is keratitis punctata. It is a most important sign to look for. Both corneæ should always be examined for this whenever an injured eye, or one that has been operated on, continues to be inflamed. The presence of "K. P." (as it is called) in this eye is always a danger signal, and its presence in the second eye invariably a proof that sympathetic disease has supervened.

The clinical manifestations will vary to some extent, but they are all part of one and the same disease. The latter always begins in the uveal tract, and *two types* may be referred to:

(a) Severe plastic irido-cyclitis.—This is the severer form and unfortunately the commoner too.

(b) Serous cyclitis.—This is a milder subacute or chronic variety. It is the rarer condition but may at any time pass into the plastic variety.

Lesions other than iritis, cyclitis, and irido-cyclitis may occur. They are as follow:

Optic neuritis.—This may occur first or develop at the same time as the uveitis, or, again, it may have a later onset. Rowan and Sutherland²² have recorded a case of slight sympathetic irritation where the exciting eye had been wounded eight years before by a piece of stone. The vision of the good eye was 6/6 and Jaeger No. 1 and the blind spot was spindle-shaped. The exciting eye was enucleated. Subsequently, a definite optic neuritis developed in the second eye, the blind spot again becoming spindle-shaped. When the neuritis had subsided, the blind spot again became normal. The neuritis had occurred one year after enucleation. Neuro-retinitis in uncomplicated form is rare.

Choroiditis is probably a frequent condition, especially in the anterior part of the fundus. It is of the disseminated type.

Fergus²³ has described a condition which he calls "sympathetic degeneration," where there is concentric contraction of the field of vision in the second eye with some reduction of visual acuity. It does not progress to blindness.

Péchin²⁴ mentions amongst the symptoms of sympathetic disease, sympathetic amblyopia, simple optic atrophy, anæsthesia and hyperæsthesia of the retina, and retro-bulbar neuritis, of which a few cases have been reported. He gives details of two cases.

Uveitis and neuritis we know are part of sympathetic disease. We require further evidence before we can add the other signs and symptoms to the list.

There are seldom any *general symptoms*. Parsons¹ gives references to the following:—headache, high temperature, delirium, and meningitis. Campbell²⁵ mentions, as evidence of mild general infection, depression, malaise, anorexia, moderate rise of temperature, quickening of pulse-rate, pain around exciting eye, and peculiar pricking sensations in the branches of the ophthalmic division of the fifth nerve.

Pathology.

A true understanding of the pathology and morbid anatomy of sympathetic disease is necessary for prevention and successful treatment. Considerable advance has been made in this direction during the past few years.

Morbid Anatomy.

In 1905 Fuchs⁷ published his famous communication on the histological anatomy of sympathetic disease. He found a lesion peculiar to the disease. This had enabled him, when examining 200 eyeballs enucleated on account of lesions capable of causing sympathetic ophthalmia, and whilst ignorant of their history, to pick out those eyes which showed an anatomical condition which he considered characteristic of sympathetic ophthalmia. When the histories were examined, he found that in these cases a sympathetic inflammation had actually been present in the fellow eye, and in these only.

In his communication the typical features are considered under two headings: (a) the cell forms, and (b) their distribution in the tissues.

(a) *Cell forms*.—(1) Small mononucleated round cells or lymphocytes. These were always present. They appeared first in the region of the blood vessels, and might be present in the tissue, either in patches or scattered about diffusely. (2) Epithelioid cells were very constant. They consisted of an extensive protoplasmic body with large, pale, oval nucleus, often excentric in position. The nucleolus was usually distinct, and other pigment granules were found in the cell. The wall in some cases was so indistinct that the cells appeared to coalesce, and might be mistaken for giant cells. In discussing the possible origin of these cells Fuchs mentions three sources: (i) From normal cells of uveal stroma. (ii) From endothelial lining of the vessels. (iii) From retinal pigment epithelium of the uvea. The epithelioid cells are developed at a late stage in the inflammation. In the early stage there is only a lymphocytic invasion. In the later stages, the masses of epithelioid cells are surrounded by the lymphocytes, so that when stained by hæmatoxylin and eosin, they appear as pinkish islands of cells, surrounded by darkly-stained lymphocytes. (3) Giant cells are frequently present, but are not essential. Fuchs found them in 50 per cent. of the cases. They are developed from epithelioid cells by fusion of several or overgrowth of one. The nuclei are irregularly grouped, and pigment is generally present. These cells may occur singly or in groups, and are usually found where epithelioid cells are most numerous. (4) Mast cells were present in many cases but sparingly. (5) Polynuclear leucocytes were rare in the characteristic inflammation. They signify, when present, an accompanying non-sympathetic inflammation. (7) Some cells which were doubtfully plasma cells. They consisted of abundant protoplasm, often stained deep-red with eosin. The nuclei contained large and well-marked chromatin granules. These cells were found at the margins of the lymphocytic nodules.

(b) *Distribution of the cells.*—The uvea is the part essentially involved in sympathetic ophthalmia. The mode in which the various parts were affected was as follows:

(1) The infiltration of the iris may be scanty. The posterior segment is affected first, and, as a rule, it does not extend anteriorly. Both lymphocytes and epithelioid cells are found. Giant cells, which may be present, are rarest in this part of the uvea.

(2) The ciliary body is always affected, although sometimes but slightly. Infiltration begins in the outer zone, and at first consists of lymphocytes. Then, the inner zone is affected, chiefly with epithelioid cells, which increase and are found in the outer zone too. The infiltration may break through and attack the pigment layer or retinal portion, and it may extend into the vitreous, forming cyclitic membranes. The ciliary muscle, usually unaffected, may be invaded by lymphocytes and even destroyed. The vessels of the ciliary body disappear early. Giant cells are found in the inner zone.

(3) In the choroid the characteristic features are most marked. Lymphocytic infiltration first occurs in the stratum of the large vessels and extends inwards, the chorio-capillaris resisting for some time. The retina is protected by the lamina vitrea, and as a rule, is not affected. The epithelioid cells appear later. The lymphocytes invade the blood vessel walls, destroy the endothelium, and fill the lumen. Giant cells appear, but may be absent.

(4) Tissues outside the uvea may be affected. The infiltration may pass inwards to the subretinal space and even to the retina. On the other hand, it may pass out to the suprachoroidea, along the posterior ciliary vessels and nerves, and along the venæ vorticosæ, and nodules may then be found in the sclera and outside. The optic nerve is little or not at all affected, there being merely a slight increase of nuclei around the vessels.

This inflammatory process tends neither to suppurate nor to caseate. The uvea becomes transformed into dense fibrous tissue, like the sclera, and all typical cell elements disappear. The fibrous tissue cells are derived either from the uveal stroma cells or epithelioid cells. This fibrotic change may be present along with recent infiltrates in the same specimen.

The characteristic lesion, then, consists of nodular infiltrates in the uvea, not unlike tubercles, but never undergoing caseation or necrosis. With regard to plastic exudation, Fuchs says that when it is present, it is usually in long standing cases. This exudation found on the surface of the ciliary body he believes to be due to mixed infection.

Sympathetic ophthalmia and enophthalmitis may be contrasted in the following table:—

Sympathetic Ophthalmia.

Enophthalmitis.

- | | |
|---|---|
| (1) Onset never earlier than 14th day. | (1) Onset any time after injury. |
| (2) Course protracted. | (2) Course not prolonged. |
| (3) Typical cell forms. | (3) Epithelioid cells rare; giant cells never; polynuclears numerous. |
| (4) Distribution. — Uvea especially choroid, and patchy, outer layer the chorio-capillaris being usually exempt. Inner segment of iris and ciliary body affected. | (4) Distribution according to site of injury—diffuse, superficial. Choroid seldom affected, but when it is, the chorio-capillaris usually involved. |

Sympathetic Ophthalmia.

- (5) Surface exudates late and consist of lymphocytes. Fibrin absent.
- (6) Organisation with almost complete destruction of uveal stroma in severe cases.

Enophthalmitis.

- (5) Exudates always present and consist of polynuclear cells. Fibrin plentiful. Albuminous fluid in tissues and coagulum in anterior chamber.
- (6) Organisation often without involving stroma.

A serous traumatic iritis, of chronic type, may occur with punctate keratitis, posterior synechiæ, etc. The infiltrate is confined to the uveal stroma, and the condition differs from sympathetic ophthalmia in that there is no tendency to attack the other eye.

Since that communication Fuchs²⁶ has published other cases confirming these findings. In one case of phthisis bulbi, in which the eye had been damaged 29 years previously, typical recent sympathetic foci were found in the choroid. There were no signs of inflammation in the damaged eye, which was removed because of inflammation in the good eye. In two cases the injuries had been slight and no plastic inflammation had occurred. Fuchs says that this shows that plastic inflammation and enophthalmitis are no essential part of the sympathetic process. He admits that it is possible to find anatomical appearances indistinguishable from the sympathetic type in cases of spontaneous irido-cyclitis, but, in his experience, this is very rare. Botteri⁽²⁷⁾ has described two cases to illustrate this point. There were nodules of epithelioid and giant cells and plastic exudate of the iris. In one case both eyes were affected. In the other there had been recurrent irido-cyclitis of four years duration. Fuchs²⁶ describes one case of an eye, excised five days after a perforating wound by a steel splinter (removed by a magnet two days after injury), for panophthalmitis. He found foci of lymphocytes in the choroid, the vessel walls being perforated by the cells in several places. He believes these to be independent of the other inflammation, and representing how very early sympathetic ophthalmia may start in the exciting eye.

Weigelin,²⁸ who has gone into the matter of diagnosis of sympathetic ophthalmia from the anatomico-pathological standpoint, examined a collection of eyes from the eye clinic of Tübingen dating from 1881 to 1909. This collection consisted of eyes which had given rise to sympathetic ophthalmia, doubtful cases of the same, and also eyes which had become affected secondarily to the exciting eye. As a control, a large number of eyes, which had been removed for traumatic irido-cyclitis, were also examined. All eyes, which had been removed earlier than fourteen days after injury, were excluded. The total number was 41. It was a striking feature that the classification on histological findings corresponded very closely to that on clinical grounds. His conclusions were as follows:—

(1) In all cases of genuine sympathetic ophthalmia there was found in the exciting eye the characteristic typical inflammation described by Fuchs.

(2) In all cases of ordinary traumatic irido-cyclitis, with and without sympathetic irritation, in which the second eye was certainly not diseased, there was a varying anatomical picture that only sometimes exhibited in detail a distant resemblance to the picture of sympathetic inflammation.

(3) In doubtful sympathetic inflammation the anatomical investigation was able to decide the question. Only in one case was a certain decision not possible on account of a high degree of degeneration in the eye.

(4) The investigation of two secondarily affected eyes showed the same histological changes to be present as in the exciting eyes.

(5) In the case of spontaneous chronic irido-cyclitis affecting both eyes there was present in the eye first attacked the typical picture of sympathetic inflammation.

As a result of these investigations, Weigelin is in entire agreement with Fuchs that sympathetic inflammation has a characteristic histological appearance and can be distinguished from traumatic irido-cyclitis. Cases will now and again be met with where it may not be possible to make an absolutely definite diagnosis from the microscopic changes. This will especially be so in some cases of chronic irido-cyclitis of spontaneous origin.

Meller,¹⁵ as mentioned above, has done work on the relationship of sarcoma in the eye to sympathetic disease. He found the typical foci in an eye in which there was a sarcoma of the choroid. The growth had undergone necrosis. He believes that this sets up uveal inflammation, and that the damaged uveal tissue forms a favourable site for the germs of sympathetic disease, and so becomes attacked. The greater the previous inflammation, the more the uveal tissue is destroyed, and hence less soil remains for the growth of the germs. This explains the rarity of sympathetic ophthalmia in cases of panophthalmitis.

Alt²⁹ has recorded a case of melanoma of the iris, adenoma-like tumour in the ciliary body, and enormous ossification of the choroid in an eye removed on account of sympathetic irritation in the other eye. The bone formation was of long standing; for the patient had been under observation for twenty years. The tissues showed numerous foci of round celled infiltration of recent date. There had never been any perforating injury.

McIlroy³⁰ has investigated sympathetic ophthalmia with regard to the presence of the plasma cell. She used special staining methods, and estimated the cells quantitatively. She found that the plasma cell is an important feature in sympathetic ophthalmia, especially in the sympathising eye. These cells are more numerous in sympathetic inflammation than in non-sympathetic cases. The plasma cell is pathological. It has an oval protoplasmic body, with a small, round, eccentric nucleus. The chromatin granules are prominent, and have a cart-wheel-like arrangement. Mitosis is frequent, and several nuclei are often present in one cell. The cells are basic with regard to their staining properties and there are no granules in the protoplasm, as there are in mast cells, with which they may be confused. Neither are the cells pigmented. Their origin is doubtful, and when degenerated, they do not return to the blood stream. They are always present in chronic inflammations, especially in tubercle and syphilis. They are absent from acute suppurative inflammations. Their presence indicates reaction to toxins. They are found to be present in the normal conjunctiva, due to constant irritation, and hence are absent from the conjunctiva of the foetus.

Parisotti¹⁸ has examined the aqueous in both eyes after injury to one and compared it with the normal. He found that any injury increased the albuminous matter in both eyes, and therefore some change must be set up in the other eye. He thinks that this is due to a disturbance of the epithelium of the ciliary body.

Parsons¹ quotes the fact that mast cells form a conspicuous feature in sympathetic inflammation and are not confined to the uveal tract, but may be found in the sclera, episcleral tissue, and optic nerve. Their intensely stained granules are very liable to be mistaken for cocci, especially when they are set free by disorganisation of the cells, as is often the case.

With regard to the infiltration in the optic nerve, it has been shown that this is limited to the intra-ocular and immediate retro-ocular portions. Typical nodules are very rare.

The blood shows no conspicuous changes, such as leucocytosis, in sympathetic ophthalmia.

Bacteriology.

So far the results of this branch of investigation have been disappointing. As Fuchs¹⁷ says: "There is scarcely any doubt but that here we are dealing with an affection produced by bacteria, which do not cause acute suppuration, but, after the analogy of many other bacteria (for instance, tubercle bacilli) cause chronic proliferations. This inflammation has the property of being transmissible to the other eye."

This negative result has occurred at the hands of able observers. Pyogenic organisms have been found on many occasions, but we cannot seriously regard these as the true causal agents. As pointed out by Parsons¹, no importance is to be attached to the presence of so-called cocci unless the author has carefully considered the possibility of having mistaken the granules of mast cells for them.

Implantation of portions of affected tissues in the eyes of animals has generally given negative results. Schirmer³², however, has obtained positive results with portions of ciliary body from an exciting and from a sympathising eye in the anterior chamber of a rabbit. In both cases a chronic uveitis was set up, leading to commencing phthisis bulbi in four to five weeks, when the eyes were enucleated. The rabbit's other eye remained normal. Schirmer regards this experiment as conclusive evidence of the presence of organisms in the sympathising eye.

Axenfeld³³ says that on all sides it is admitted that sympathetic ophthalmia is an infectious disease which arises by the inoculation of bacteria.

The relationship between tuberculosis and sympathetic ophthalmia can be laid on one side.

zur Nedden³⁴ has performed experiments by injecting the blood of sympathetic patients into the vitreous of the rabbit. He found that this caused more inflammation than normal blood. After re-inoculation experiments from the vitreous thus infected, he eventually obtained a pseudo-diphtheria bacillus. When injected subcutaneously, or into the peritoneum, it caused localised inflammatory nodules, which resolved spontaneously. Even when in small quantity into the vitreous, it caused insidious inflammation, leading to shrinking, very similar to the inflammation produced when the organisms were injected into the blood. When large quantities of the organism were injected into the blood of the carotid, metastatic inflammation, healing after some weeks, was produced in the eye. The animals, in general, remained healthy. zur Nedden himself does not claim definite proof as to this bacillus being specific. Axenfeld says that injection of serum of a patient suffering from sympathetic disease has given no benefit as a means of treating that disease, nor could he convince himself that the blood of sympathetic patients had any more effect on the eye of a rabbit than the blood of a normal person. zur Nedden's experiments show that, here and there, organisms of the group of pseudo-diphtheria bacillus occur, and can multiply and cause insidious inflammation in the vitreous, not only when directly injected, but also by infection of the blood stream.

Rollet and Aurand³⁵ performed experiments in which they inoculated the eye with certain bacteria and their toxins. They injected the optic

nerve sheaths of rabbits, using the pneumococcus, influenza bacillus, diphtheria bacillus, streptococcus, staphylococcus, and tubercle bacillus. They were successful only with the tubercle bacillus. They produced a papillitis and inflammation of the sheaths of the eye inoculated. Tubercles or pseudotubercles were found, consisting of epithelial cells only. The choroid was affected. The other eye showed congestion of the optic nerve, perivascular deposits of small cells, thickening of the sheaths in which was a mass formed of epithelioid cells but containing no giant cells. They claim to have produced a tuberculous sympathetic ophthalmia. No other part of the body showed tubercle. They believe that the spread was *via* the sheaths, vaginal space, vessels, peri-optic cellular tissue, and perhaps by the nerve itself.

Whatever may be the organism causing sympathetic disease we have to consider how it gets into the eye.

Seeing how often this condition follows wounds, it has been supposed that the organism enters through the wound. In that case it must be introduced from the outer world by the object causing the wound or else must be present in the conjunctival sac at the time of the injury. This exogenous source has held the field for some time. When the disease supervenes after a considerable period, it is supposed that the germs have remained latent. Such has been maintained by Weigelin,²⁸ who insists on the necessity of a perforating wound. Parsons holds similar views with regard to exogenous infection. On the other hand, we have those cases of sympathetic disease arising in the presence of intra-ocular sarcoma, and Meller¹⁵ believes that this is brought about by an endogenous infection through the blood. The organisms attack the damaged uvea, where they find a suitable nidus. The virulence of the germ increases, so that the uvea of the other eye now falls a victim, and hence sympathetic disease takes place. Those who maintain that a perforating wound is necessary say that these cases of sympathetic disease belong to the same category as those of chronic irido-cyclitis of spontaneous origin where a lesion is found similar to that described as characteristic of sympathetic disease. In the endogenous infection the organisms must, in the first place, enter the body through some surface lesion in skin or mucous membrane, and Meller does not deny that this may sometimes be through the wound in the eye.

Heerfordt has suggested that the eye becomes reinfected at a subsequent date through the old wound.

In the present state of our knowledge it appears to be impossible to make any dogmatic statement as to the mode of infection.

Cytotoxins.

This section on pathology cannot be concluded without some reference to the work done on cytotoxins.

Santucci³⁶ has suggested the possibility of cytotoxin from the injured eye causing sympathetic disease. He performed various experiments where he injected emulsions of eyes, healthy and pathological, into animals, subcutaneously and subconjunctivally, and produced keratitis and iritis. His idea is that a damaged eye has a toxine developed in it which becomes absorbed. The attack of inflammation in the other eye is determined by the resistance against this toxin, and depends on the amount of antitoxin found. Golovin³⁷ also is an advocate of the cyto-toxin theory. Axenfeld³³ says the whole clinical course of sympathetic inflammation is against a purely toxic origin. Elschnig³⁸ has done recent work on the effect of antigen within the eye and on the antigen value of eye pigment, and so has opened up new ground. His object has been to test the anaphylactic theory, that sympathetic

ophthalmia may be due to some antigen from the uveal tissue being absorbed. These experiments are very interesting, but at the present there is nothing definite to state with regard to the solution of the question of sympathetic ophthalmia.

Mode of transference from one eye to the other.

This interesting point has occupied the minds of many workers ever since the recognition of sympathetic disease. Many hypotheses have been advanced, some rather fanciful, and a few irreconcilable with present-day pathology. An excellent summary of these theories is given by Parsons,¹ who retains the classification of Schirmer.

I. *Pure nerve theories*: (a) Optic nerve theory. (b) Ciliary nerve theory.

The former (a) supposed that the inflammation travelled from one eye to the other *via* the optic nerves and chiasma. The latter (b) maintains that irritation of the ciliary nerves is transmitted to the opposite ciliary nerves, the impulses setting up changes in the other eye which eventually amount to inflammation. Examination of the work on these theories leaves one unable to accept them, and they are of greater historical interest than anything else.

II. *Pure bacterial theories*: (a) Transmission by metastasis. (b) Transmission by reversed venous flow. (c) Transmission by lymph channels.

Transmission by metastasis seems to be the most rational of these hypotheses, and it is in keeping with sound pathological principles.

Lenz³⁰ agrees with Berlin and Roemer with regard to an organism with specific habitat in the nervous system carried from one eye to the other by the blood stream. This probably takes place by the venous channels, but may also travel by the retinal arteries.

Römer⁴⁰ has done experimental work on metastasis. He performed intra-ocular inoculations with micro-organisms of various kinds. They could be found in the other eye without any evidence of spread along the optic nerves. They rarely caused secondary abscess formation in the eye but many were found in the internal organs. Even spores of saprophytic bacteria found their way throughout the body, including the other eye, and this could have occurred only through the medium of the circulation.

Parsons¹ says that the bacterial metastatic theory is to him the most probable. The fact that the organisms pick out one part of the body need be no objection, for we know that many bacteria, notably the typhoid, have preference for certain parts of the body. There are many points about sympathetic disease which can be satisfactorily explained only on bacteriological grounds. It is probable that the organism is pathogenic for the eye only. The histological lesions suggest as probable some resemblance to tubercle and leprosy. Parsons sums up the matter by saying that no other theory explains so well the uveitis which characterises most cases of sympathetic ophthalmia. The analogy of tubercle, syphilis, etc., is obvious, and the accumulation of evidence of the topical selection of different bacteria favours the theory. The organisms multiply in the exciting eye; if this is removed early, infection does not occur, but if the organisms have escaped in quantity into the circulation, sympathetic ophthalmia may follow. It is probable that early encapsulation may occur in the exciting eye. As is well known, in this condition, bacteria may long lie dormant but viable. Slight injury or other cause may set them free, thus explaining the occurrence of sympathetic ophthalmia long after the first injury, although preceded at a short interval by inflammation in the exciting eye.

To the remaining theories but brief reference need be made.

The theory of reversed venous flow supposes that the organisms escaping into the cavernous sinus, pass by communications to the other sinus and thence to the orbital veins and so the other eye. There are many objections, one especially being the extreme rarity of sarcoma affecting the other eye, for which this theory should equally hold good. The theory of extension through lymphatics, especially the optic nerve sheaths, has been brought forward. Experimental work has failed to substantiate this theory.

Another group of theories is known as

III. The combined theories.

(a) Meyer's theory.

(b) Schmidt-Rimpler's theory.

The former, that of Meyer, maintains that the ciliary nerve irritation only causes sympathetic disease if the second eye already contains pathogenic organisms; if the eye is normal, sympathetic irritation is set up.

The latter theory, that of Schmidt-Rimpler, supposes that the ciliary nerve irritation prepares the way for the unknown infective agent, which is innocuous unless the circulation and nutrition of the second eye have been thus impaired.

The last group of theories comes under the heading of toxins.

IV. The toxic theory.—This assumes that the inflammation is due to toxins from bacteria or perhaps from degenerated cells. Removal of the exciting eye should in this case be a safeguard against the disease in the other eye, but we know that this is not the case. This has been referred to above under the work of Santucci and Elschnig.

Diagnosis.

There is nothing clinically pathognomonic, as said before, and there are no trustworthy premonitory symptoms in the second eye. Signs of iritis and irido-cyclitis will be present. The ætiology must be carefully gone into.

Swanzy² says the diagnosis must be considered under the following headings:

(1) The exciting eye. The infection is ectogenic except rarely when there is sarcoma of the choroid.

(2) The sympathising eye. A plastic inflammation attacking all three parts of the uvea, chronic in type, and showing improvements and relapses.

(3) The interval since the injury.

(4) The general system. Possibility of syphilis, rheumatism, tubercle, diabetes, and other causes of inflammation of the uveal tract.

Moretti⁴¹ has pointed out the great importance of recognising early the connection between eye inflammations and a pre-existing injury, so that immediate expert advice can be obtained.

Prognosis.

This must always be serious when once the disease has become established. Even the milder serous type may become the more severe plastic at any time. Much will depend on early diagnosis and prompt treatment. The result may be a good recovery, but even this may be marred by subsequent relapse. We cannot be sure the disease is at an end until months after the cessation of symptoms. With regard to neuritis, this usually subsides favourably after the exciting eye has been removed.

Treatment.

"Prevention is better than cure," says the old adage, and never were these words truer than for sympathetic ophthalmia. Prevention is brought about by removal of the exciting eye at the right time and not too late. Swanzy² gives this excellent advice:—

(1) If the sight of the eye is hopeless and beyond recovery of any use enucleate at once.

(2) If there is a prospect of saving the sight pay full attention to the surgical side—cleanse the wound, remove prolapsed iris, etc.

(3) If the wound is infected, even if there is some useful sight, enucleate at once. He says that we cannot be sure about the prevention of sympathetic disease until a lapse of four weeks. If it takes place, excision has a modifying effect.

If sympathetic ophthalmia has supervened before the eye has been removed, Swanzy lays down the following rules:—

(1) Remove the damaged eye at once if quite blind and hopeless. The prognosis is better.

(2) If the exciting eye possesses slight degree of sight it should not be removed. This may ultimately be the better eye.

Most ophthalmic surgeons will agree with this sound advice.

Schirmer says that when sympathetic ophthalmia has broken out, the exciting eye should not be removed, unless it be absolutely blind; or unless—if it still possess merely perception of light—it has been for several weeks very soft and reduced in size; or that, by reason of extensive corneal opacity all hope of restoration of form-vision must be abandoned.

Woodruff⁹ says excision of the exciting eye is especially indicated by (a) lowered tension, and (b) poor projection.

Valude¹² says treatment of injured eyes is to be very radical before the advent of sympathetic mischief, sacrificing all suspicious and blind eyes. On the contrary, treatment should be very conservative when dealing with a wounded eye which possesses useful sight.

With regard to removal of the exciting eye, enucleation is to be preferred rather than any of the other operations, for reasons stated above. The nerve should be divided as far back as possible, for fear that it may be invaded by the inflammation.

With regard to local treatment of the affected eye, there is nothing new to add to the usual treatment of iritis and irido-cyclitis. Owing to the great damage done by posterior synechiæ, the pupil will require to be kept well dilated by atropine. Injections of cyanide of mercury (1—3,000) have been made into the optic nerve and sheaths after enucleation, especially when following evisceration or a modification thereof. Subconjunctival injections of salt solution, especially when the tension in the eye is raised, have been recommended. The patient is better treated in bed, with the room darkened.

As to general treatment, until recent years mercury was pushed vigorously. Gifford¹³ has given a full description of his method of treatment by means of salicylate of soda. He has advocated the remedy for some years, and there is abundant evidence in support of its efficacy wherever it has been tried. He gives large doses, and advocates 1 grain for every pound of body weight in twenty-four hours. This for an average man would be 150 grains a day. If this does not produce immediate marked improvement, the daily dose should be increased to 200 grains. Unless there is some idiosyncrasy, this amount can be given for four to seven days in succession without danger, if the patient lies quietly in bed. He usually gives 30 grains in two drachms of brandy with half a glassful of water five times a day. According to the severity of the case, he omits the salicylate on one day out of every four to seven days; and when active signs of inflammation have disappeared, he gives it on two days out of three for two to three weeks longer. With old people, or those with weak hearts, he tries to do with smaller doses. He advocates this treatment for other cases of uveitis. Delirium may require the dose to be diminished or stopped altogether. Out of sixteen genuine cases of

sympathetic ophthalmia he had the following results from his treatment:—two bad, one moderate, one good, and twelve very good. In all but one the exciting eye had been removed. He believes that mercurial inunctions should be used as well every day for a week, unless the gums are affected sooner; this is continued for one week out of every three or four. Arsenic may be given in the intervals.

If the salicylate upsets the stomach, it can be given well *per rectum* in doses of 60 grains in a glassful of warm water two or three times a day. Aspirin, salicylic acid, or other salicylic compounds may be given instead. Such favourable reports have been published with regard to this treatment that it should always be tried in cases of sympathetic ophthalmia.

Before closing this Review I would just mention the importance of abstaining from any operative treatment until long after (twelve months) the last signs of inflammation. Swanzy² strongly emphasises this point. Even if glaucoma is present, the most that may be permitted is a scleral puncture or the anterior chamber could be tapped. Iridectomy, especially, must not be attempted.

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TRANSLATION.

SOPHOL AS A REMEDY IN OPHTHALMO-BLENNORRHŒA
NEONATORUM,(With a note on its use in conjunctivitis due to *micrococcus catarrhalis*.)*

BY

DR. OTTO V. HERFF.

OPINION as to the best means of preventing ophthalmia neonatorum is undergoing a gradual change. The conviction is growing that silver nitrate, still largely employed as a preventive agent, is unsatisfactory in many respects, and that the success achieved by it does not counter-balance the severe irritation which it frequently occasions. Humanitarian considerations alone should prevent its further employment, provided always that a satisfactory substitute is available. It is in order to discourage the use of the nitrate, and to demonstrate that it may with advantage be superseded, that I publish my further experiences with sophol.

I first applied sophol as a preventive of ophthalmia neonatorum on June 1st, 1905, at the Hospital for Women, Basle. In the five years which have since elapsed, I have employed this silver preparation exclusively as a prophylactic in the case of more than 7,500 children. The number is so large that one instance of probable failure may almost be ignored, and I may justly speak of 'constant success.' On the 26th of June, 1905, there was noticed in a legitimate child an early infection, which, however, I am satisfied was incurred during labour, on account of the reposition of a prolapsed umbilical cord after the induction of premature labour by rupturing the membranes. Nevertheless, this case must be regarded as a preventable early infection, and will be quoted as such in my statistical tables. A late infection developed in an illegitimate child on September 7th, 1908. Since the first date mentioned, June 26th, 1905, there has not been a single case of early infection among the 7,500 children treated in my Hospital, and only one case of late gonorrhœal infection.

The following short summary (the figures, I may say, will bear the strictest investigation) provides ample proof of the value of sophol, and demonstrates the success of my endeavours to attain the ideal of Cohn. As I have personally examined the eyes every day, an oversight or intentional suppression of cases is absolutely out of the question. By the courtesy of the Sanitary Authorities (in Basle notification of the disease is compulsory), I was enabled to ascertain that a few of the babies discharged as healthy from the Hospital developed infections later on in their homes.

On the whole, I estimate the proportion of "gonorrhœas" in my institution as at least sixteen per cent., so that there must have been, among the 7,500 children, not fewer than 1,100 which were subject to infection, and yet none of these incurred early infection, and only one a late infection, due to the fault of the mother.†

*From the *Münchener medizinische Wochenschrift*, 13 September, 1910.

†I learned a few days ago of a legitimate child which was attacked on the ninth day by a very slight secretion from the left eye. Bacteriologically examined, the secretion showed no gonococci, and the child was discharged the following day as almost cured, but was re-admitted six days later for gonorrhœa in both eyes. The mother, now in hospital suffering from gonorrhœa of the appendages, told me that she treated the baby with compresses of camomile tea. I hardly think I am mistaken if I ascribe the infection to the treatment, but I must include the case as one of late infection.

	Number of children	Early infection %	Late infection %	Total %	Remarks
Number of children born in the town Hospital for Women	21,640	0.45	0.16	0.7	Compiled from official communications.
Nitrate of Silver ...	5,661	0.15	0.12	0.27	
Protargol	3,000	0.16	0.16	0.16	Two late infections, including one doubtful.
Argyrol	500	—	—	—	
Sophol	7,536	0.013	0.013	0.026	One early and one late infection.
Total Protargol, Argyrol, and Sophol in 8½ years	11,036	0.009	0.027	0.03	
					Total : one doubtful early infection, two certain late and one doubtful late infections = 4 cases.

These figures show that since the use of nitrate of silver in the Hospital was discontinued (at the beginning of the year 1902), the number of total infections has decreased nine times, and that of the early infections (the important point) sixteen times, the latter the only case being, as a matter of fact, a doubtful one. One must remember that this result was obtained, roughly speaking, in 11,000 children, among the mothers of which there must have been at least 1,700 suffering from gonorrhœa. The reduction in the number of infections is even more striking when compared with the total infections; the late infections are reduced twenty-seven fold and the early infections fifty-fold. There is no lack of gonorrhœa in Basle, seeing that this large city is very much under the influence of abolitionists and without regular control of prostitution. Has there ever been a similar success obtained with nitrate or acetate of silver during an equally long period, and with children of this class?

In former communications (*Münch. med. Woch.*, Nos. 46 and 47, 1909) I demonstrated beyond doubt that of all the remedies coming under consideration, argyrol and sophol caused the least irritation, decidedly less than acetate of silver, which, while much less effective, possessed the advantage of constancy. To-day I am in a position to state that a solution of sophol which was a year old, and which had remained in a brown glass bottle on my desk unnoticed for more than six months, proved in the case of 100 children quite as effective for practical purposes as a fresh solution, an observation which, as is well known, does not apply to other silver preparations, including nitrate of silver, acetate of silver, and protargol.

The application of sophol is very simple.—For the last year I have employed the method suggested by Ahlfeld; that is, dropping one large drop, or better still, two or more, on the *closed* eyelids or on the inner canthus. The child opens its eyes itself, or the midwife gently draws them apart. It is of importance, as shown by Darier, the champion of the organic silver preparations, that the edges of the eyelids and the eyelashes should be well saturated with the solution, as it is in these localities that the gonococci chiefly lurk. The application may very well take place after the division of the cord and after the child has been bathed, so that there need be no hurry over the process, which is perfectly simple and easy. By employing a

"Phoenix" drop glass (Bandekow Bros. of Berlin) injury to the child's eyes even by unskilled hands, is quite out of the question. The preparation of the solution is quite a simple matter, especially since the drug is now obtainable in the form of convenient tablets. Since the irritating effects of sophol are very slight, and seldom last longer than twenty-four hours, and since in not a single case have they been so severe as to necessitate any other treatment beyond wiping the eyes, or to suggest the suspicion of an infection, I am personally convinced that sophol deserves to occupy the front rank as a prophylactic of ophthalmia neonatorum. As a matter of fact, it is already in use in the Canton of Solothurn, although as yet in the usual optional fashion.

Bavaria enjoys the distinct merit of being the first country which has proceeded logically in this matter, and introduced a general system of prophylaxis. In accordance with an Order from the Royal Ministry of State for Home Affairs, dated May 4th, 1910, "Midwives must have as part of their equipment a small blue dropping-bottle containing a 1·2 per cent. solution of acetate of silver, which they must take with them to every confinement, and from which they must drop into each eye of every newly-born child one drop before dividing the cord." An excellent and sensible arrangement, of which the one regrettable feature is that the less efficient acetate of silver has been preferred to protargol and, above all, to sophol. Darier recommends, in his dissertation ("*Des nouveaux sels d'argent au thérapeutique oculaire*, Paris, 1906,") argyrol in particular, often in combination with a lavage of the eyelids with protargol—"protargolage." I have also employed argyrol, although only in about 500 cases, and can fully confirm its great freedom from irritating qualities. But enquiries which I have made, and which were supported by chemical experiments, revealed a want of stability in the composition of the solution, which was by no means inconsiderable, and this fact induced me to abandon it.

I have treated with sophol about 100 cases of conjunctivitis caused by various kinds of bacteria, including staphylococci, streptococci, bacillus pyocyaneus, Morax bacilli, bacilli which from their cultural qualities occupied a place intermediate between diphtheria bacilli and Morax bacilli, and which formed a real croupous membrane, etc. Although I am quite satisfied of the curative value of sophol, the number of these cases is not sufficiently large to warrant my publishing them for the purpose of proving the point. I feel that a few remarks, however, may not be out of place.

Darier points out emphatically that one should not be tempted by the rapid cure effected by argyrol or protargol to discontinue the treatment too soon, as relapses may occur which have a tendency to be very obstinate. I have had a similar experience. It related to the one case of early infection which happened under the prophylactic treatment with sophol. The child developed on the second day a severe gonorrhœa of both eyes. By instilling three times daily a 20 per cent. solution of sophol and cleaning the eyelids with perchloride of mercury, the disease was cured by the fifth day. Unfortunately, the treatment was then discontinued, as I was not at that time aware of Darier's warning. Two days later there was a relapse or a new infection on the part of the mother, who was very troublesome and suffering from severe disease of the appendages. The child was then transferred to the eye-clinic, where the diagnosis of gonorrhœa was confirmed and a cure obtained in the usual way. I have no doubt now, especially in view of my experiences, published in the *Zentralblatt für Gynækologie*, No. 46, 1908, that a more extended use of sophol at the time would have resulted in complete success.

The remedy must be employed, according to the danger of infection or the severity of the disease, in stronger or weaker solutions; if necessary, it should be applied hourly, and its use continued prophylactically for several days after the completion of the cure. Results may be obtained which are remarkable. In this way I have succeeded, as a rule, in curing almost all the simple cases of conjunctivitis, including those with severe suppuration, in a very short time. As bearing out this statement, I may mention the following interesting two cases of infection with *micrococcus catarrhalis*:

The first and milder case was a child seven days old, and the condition serious in character. Examination showed in one single specimen—apart from a few bacilli (*xerosis bacilli*)—a heap of Gram-negative diplococci which were exactly like gonococci, except that they lay extra-cellularly. The mother was free from gonorrhœa. By the application twice daily of a 5 per cent. solution of sophol, the cocci disappeared in two days, and the inflammation healed up rapidly on the third day. I have no doubt that the condition was due to *micrococcus catarrhalis*, but, as no cultures were made at the time, the case figures in my statistics as one of late infection in the protargol period.

The second case is of very recent date.—The right eye swelled up considerably in a very short time on the ninth day after the child's birth, and there was an abundant discharge of thick white pus. The eye was puffed up completely, the folds and ocular conjunctiva being severely swollen. Naturally, my first thought was of gonorrhœa, although the clinical picture was not quite the usual one. In fact, there were Gram-negative diplococci which lay extra-cellularly, heaped in lumps, and which resembled gonococci in every respect. But the culture showed with certainty the presence of *micrococcus catarrhalis* and also a few bacilli (*xerosis* or *coli*?). By the use of ice-bags and the application three times daily of a 5 per cent. solution of sophol, the swelling went down so rapidly that the child was able to open its eyes after forty-eight hours. The sophol was discontinued, and the eyelids were cleaned only with boric acid solution. On the fifth day the eye was definitely cured, and the other remained sound without any further protection. The mother, who was not suffering from gonorrhœa, admitted having had her fingers near the baby's eyes.

These two cases serve as evidence that sophol is effective in other forms of inflammation of the eye, although I may say that I have never seen a blennorrhœa in children during their first few days which has been caused by any diplococcus other than the gonococcus. Similar experiences have been reported by others.

I have therefore arrived at the conclusion that sophol* must be regarded not only as a prophylactic but also as a therapeutic remedy.

*Sophol is stated to contain 20 per cent. of silver.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—EMBRYOLOGY.

- (1) Magitot, A.—A study upon the development of the human retina. (*Etude sur la développement de la rétine humaine.*) *Annales d'Oculistique*, avril, 1910.
- (2) Calderaro.—A note on the study of the anatomy and embryology of the axial vitreous. (*Contributo allo studio della anatomia del vitreo assiale negli embrioni e nei feti umani.*) *La Clinica Oculistica*, Gen.-Feb., 1911.

(1) **Magitot** has examined the eyes of 35 human fœtuses between the ages of four weeks and nine months, from a study of which he draws the following conclusions :—

The development of the retina in the human embryo and fœtus passes through three stages :

1.—An epithelial stage which extends to the last half of the second month. In conformity with what happens in the neural tube, two zones are found in the inner layer of the secondary optic vesicle. One of these consists of eight or ten rows of cells, with elongated nuclei and scanty protoplasm, pressed against each other. Their cellular multiplication, according to the principle of Altmann, takes place towards the pseudo-limitans externa, which bounds the cavity of the primitive optic vesicle. The other or marginal zone, the size of which at the end of the fourth week equals that of the epithelial one, is fibrillar and probably due to early development of the supporting cells, which are not yet differentiable. This zone contains some cells with polylobar nuclei and protoplasm full of refracting granules.

2.—A stage of differentiation, which begins between the sixth and eighth week. The essential fact is that this differentiation commences at the site of the future macula and shows itself by an intense proliferation of cells with round nuclei, the future ganglion cells. At the end of the second month this differentiation reaches the ciliary region. These cells almost at once send out centripetal prolongations, which constitute the first appearance of the layer of nerve fibres. The number of these cells is so great that it is hardly possible that they come from the zone of indifferent epithelial cells alone. In addition, there are some mitoses among them. The first nerve fibres in the optic nerve appear at the same period.

Up to the end of the third month the differentiation takes place only on the vitreous side of the retina. The multipolar cells get into order, their dendrites increase, and the internal plexiform layer is formed. At the same time the original marginal zone disappears.

At the end of the third month the nuclear divisions at the site of the future macula slacken, and a row of cells with large clear nuclei appears close

to the limitans externa. This row is separated by a very small space from the mass of subjacent cells. From this moment the retina has its three layers at the site of the posterior pole, but passing towards the ciliary region, the differentiation becomes less advanced.

3.—A stage of growth.—This commences in the macular region at the commencement of the fourth month, and in the peripheral retina during the fifth month. It begins with the appearance of traces of the central cones. The formation of the inner limb shows itself by a raising of the limitans. At the summit of this bud there are two centrosomes which appear to carry with them part of the cytoplasm. These diplosomes are those which ordinarily preside over the direction of the spindles in karyomitosis. At the end of the fifth month a small cilium, the first rudiment of the outer limb, appears at the summit of the bud. At its base is one of the two central corpuscles which has advanced slightly in front of its fellow. At the end of the fifth or the beginning of the sixth month, the cilium, which has increased in size, is surrounded with a very delicate grumous substance. The process of development of the visual cell is thus the same as that of other ciliated cells, such as the spermatozoon. It is about the same period that the photomotor reflex is first obtainable and the retina commences to react to light.

During the sixth month the rods and cones extend to the ciliary region. At the posterior pole, although the growth is very advanced, there is a slight irregularity, the macula passes through the stage of an area before reaching that of the fovea.

The middle layer of the retina, in which three grades of cells with different appearances are recognisable in the fourth month, commences to get into order in the sixth month.

In the seventh and eighth months growth takes place chiefly in the middle layer and the external granular layer. The external plexiform layer remains very narrow.

The stage of growth is not finished at birth. The visual cells, in particular, have only reached a third of their size in the adult. R. J. COULTER.

(2) **Calderaro** has been able, by means of the collection of embryos in the Clinic at Rome, to clear up certain points in the development of the axial vitreous. The paper is most interesting, and is fully illustrated by microphotographs.

As a result of his investigations, Calderaro comes to conclusions which he summarises as follows:—

In the study of these embryos, three structures stand out which demand special attention:—(1) the hyaloid artery, (2) the prepapillary sheath, (3) the hyaloid canal.

1.—The hyaloid artery can be recognised as a central vascular trunk, giving branches towards the back of the lens in the human embryo of the twelfth week. At this time the artery does not lie wholly in the antero-posterior axis of the eye, but bends downwards and inwards at its distal extremity. The trunk is in length about equal to half the distance between the papilla and the lens. The branches finish at the posterior surface of the lens, where they join the tunica vasculosa lentis. One, rather larger than the others, goes on to join a vessel of the mesoderm between the ectoderm and the optic vesicle.

The development of the retinal vessels is considerably later than that of the anterior branches. In the fifth month these vessels attain their highest development and then the regressive changes begin, which lead to the disappearance of the hyaloid artery. This process goes on gradually; at the end of the fifth month the lumen is somewhat contracted; in the sixth

month the circulation is stopped ; and later, in the seventh month, the artery is replaced by a thin cord, which, finally, disappears in the eighth or ninth month.

From this it would seem that the hyaloid artery has no other function than to supply a vascular rete to the posterior surface of the lens, and to ensure the connection of this with the pupillary membrane, by passing over the equatorial margin.

2.—The prepapillary mass becomes first apparent when the vitreous branches of the hyaloid artery begin to undergo regression. It forms a cellular sheath which surrounds the artery immediately on its exit from the papilla, without, however, actually touching its walls. It is made up at first of two layers, the inner closely surrounding the vessels, the outer like a loose mantle, spreads over the papilla and gives the appearance of a cone standing on the disc, from which the hyaloid artery emerges. The prepapillary mass increases rapidly, and with its increase the inner of the two layers fails. From the sixth month onwards, the mass shrinks, and the space between the artery and the sheath disappears, until, in the ninth month, the mass forms one structure with the residual filum of the artery. At birth, the sole remains of the mass are a thin transparent membrane lying over the point of exit of the vessels.

3.—The hyaloid canal is first distinguished in the fifteenth week, when the peripheral branches of the central artery have disappeared and the main trunk alone is left, with a few twigs to the back of the lens. The hyaloid canal begins close to the end of the sheath, and passes forwards, ending at the back of the lens in an elongated funnel.

Its section is not circular but oval with the long diameter vertical. The vitreous of this canal is very transparent, with few fibrillæ and very small lacunæ. The wall is formed of other fibrillæ which condense themselves in a ring round the clear area.

In the fourth month the canal loses its vitreous content, and becomes narrower. The contents are a number of rectilinear fibres, running longitudinally ; these gradually disappear. As the sheath shortens and disappears, the canal detaches itself therefrom and spreads over the disc, leaving an empty funnel-shaped space.

HAROLD GRIMSDALE.

II.—TUBERCULOSIS OF THE ORBIT.

- (1) Birch-Hirschfeld, A—A contribution to our knowledge of Tuberculosis of the orbit and the optic nerve, and of the changes which take place in the globe after resection of the optic nerve. (*Zur Kenntniss der Tuberculosis der Orbita und des Sehnerven sowie der nach Resection des Optikus am Bulbus eintretenden Veränderungen.*) *Zeitschrift für Augenheilkunde*, September, 1910.
- (2) Lebenhart, Edward.—Tuberculosis of the orbit. (*Ueber Tuberkulose der Orbita.*) *Archiv für Augenheilk.*, Februar, 1911.

(1) Birch-Hirschfeld, of Leipzig, deals with tuberculosis of the orbit, a disease which is by no means often seen, or which if seen, is confused with tumour. In his case an exophthalmos developed, and gradually increased. The eye remained normal. A diagnosis of tumour was made, and Krönlein's

operation performed. The tumour was so involved with the optic nerve that it was necessary to resect the latter. A frozen section led to an erroneous diagnosis of round-celled sarcoma. A recurrence took place and the orbit was exenterated. The tissue removed contained neither caseating foci nor giant cells, but tubercle bacilli were undoubtedly present in it. The nature of the changes found in the orbit, in the nerve, and in the eye are carefully detailed. The author summarises the subject as follows:—

1.—Tuberculosis may develop in the orbit and give the complete clinical picture of a malignant orbital tumour. Even when a piece of tissue is examined histologically, mistakes have been made upon more than one occasion: tumour has been diagnosed when, in reality, the growth was tuberculous.

2.—Orbital tuberculosis may develop under the microscopic picture of simple chronic inflammation with a diffuse infiltration of lymphocytes, plasma cells, follicle-like foci, much formation of new fibrous tissue, and changes in the vessel walls, without giant cells or tubercles. In such cases the diagnosis is made by the detection of tubercle bacilli, by inoculation experiments, and by the effect of test injections of tuberculine.

3.—Starting in the orbit, the process may attack the optic nerve in isolated spots on the dural sheath, and develop in the tissues of the nerve without causing in the early stages obvious changes in the fundus as seen by the ophthalmoscope, and with no loss of central vision. Even when the optic nerve has been implicated, healing can take place, leaving behind a partial peripheral atrophy of the nerve.

4.—Even partial excision of the diseased tissue may end in complete cure.

5.—The case described gave the opportunity of investigating the changes which had taken place in the human eye two months after resection of the optic nerve. The discoveries which Wagenmann, Hertel, and Schreiber made from experiments with rabbits were confirmed, with the difference that after division of the optic nerve the ganglion cells of the inner layer of the human retina became completely degenerated sooner than those of the rabbit, a difference which can be explained by reference to different arrangement of the retinal vascular systems of the two.

T. HARRISON BUTLER.

(2) Birch-Hirschfeld in the Graefe-Saemisch *Handbuch** has stated that tubercle of the orbit is limited to the anterior part with little tendency to involve the orbital tissue, globe, or optic nerve; that deep-seated tubercle exists for the most part as periostitis of the orbital wall but may arise from the lacrimal gland, tear-sac, or the globe; and that primary tuberculosis of the retro-ocular tissue cannot be excluded.

Lebenhart, of Prague, comments on the rarity, according to literature, of cases of tuberculosis of the ethmoid and sphenoid bones involving the orbit. He thinks they are not as rare as they would seem, and he records two cases:—

CASE NO. 1.—A child, *æt.* 4 years, with tuberculous dactylitis and tuberculosis of the wrist joint. A left proptosis of inflammatory origin developed, the anterior part of the orbit appearing normal. A phlyctenular keratitis made it impossible to examine the fundi. X-ray examination of the skull was of no positive value. Nasal examination showed hypertrophy and increased secretion in the region of the left middle turbinate bone, but no evidence of sinus suppuration. In spite of this, a diagnosis was made of periostitis or caries of the ethmoid involving the orbit, and the case was operated on. A curved incision was made along the upper and inner orbital margin and the ethmoid exposed, when necrosis and caseation were found. This was thoroughly curetted and drained through the orbital wound. The caseous material contained lymphocytes, epithelioid cells, and giant cells, but no tubercle bacilli were found. There was slight elevation of temperature and the exophthalmos did not subside. Next an intra-nasal operation was performed, the middle turbinate bone being removed and the ethmoid cells opened up. This also did not reduce the exophthalmos. The left disc was now observed to be pale and the light

* II Aufl., IX Bd., S. 444.

reflex feeble. A further and more extensive operation was now performed on the orbit. After this the left pupil light reflex was restored, but the disc became paler and sight failed. There was an abundant discharge from the nose and wound. After a while the right disc showed neuritis and sight failed. The child died without signs of meningitis. On *post-mortem* examination, the optic nerves at the chiasma were found to be involved in tuberculous material as well as the olfactory tract in the region of the lamina cribrosa ethmoidalis. There was caseation in the pharyngeal lymphoid tissue and in the bronchial glands. The base of the skull, together with the orbits and nasal cavities, were decalcified and sections cut. The disease appeared to spring from the fore part of the sphenoid which was involved by tuberculous granulation tissue with caseating foci. It extended into the left orbit and filled the posterior portion.

CASE No. 2.—Child, *æt.* 3 years. The history was that the child had received a blow on the head, and ten days afterwards left exophthalmos had developed and gradually increased. The child was blind in both eyes and presented signs of rickets. The left eye was displaced forwards and outwards. Nothing could be detected in the orbit on palpation. The movements were normal. One pupil light reaction was impaired. Corneal sensibility was not affected. Ophthalmoscopic examination showed the right disc to be normal; the arteries were a little contracted. The left disc was white with well defined margins and physiological cup. The arteries were certainly contracted. There were no signs of syphilis and the Wassermann reaction was negative. Nasal examination gave rhinitis and hypertrophy of tonsil. The nervous system showed no signs of being involved. Later on, reaction to light was lost on both sides. A diagnosis was made of glioma of the left optic nerve spreading over to the right *via* the chiasma.

The case was operated on by Professor Elschnig. The left eye was removed and the orbit thoroughly explored. This led to the discovery of caseating tubercle of the ethmoid, optic canal, sphenoid, etc. The orbit was cleared out and all the diseased bone curetted. Drainage was through the nose and orbit. Immediately after the operation, the right pupil reacted to light. The right exophthalmos disappeared and no signs of inflammation or changes in the papilla were found, but the eye remained amaurotic, although the light reflex was brisk.

The first operation determined the diagnosis as obviously tubercle of the sphenoid. After three days, the pupil was again inactive to light, so a second operation was performed *via* the orbit. The inner wall was thoroughly explored through a curved incision and caseated material was scraped away from the ethmoid and sphenoid bones. The wound was packed with gauze and drained. Immediately the pupil became normal for size and light reaction. There was slight rise in temperature and some inflammation in the region of the wound giving rise to some exophthalmos. Again, the light reflex became implicated and gradually disappeared. Ophthalmoscopically, there was simple optic atrophy. The wound was granulating up when the child was last seen.

Lebenhart says that the important lesson to be learnt from these cases is that by early radical removal of the tuberculous disease without doubt the sight of at least one eye should be saved. When one eye shows optic atrophy and has been blind for some time, removal of this in order to assist in eradicating the disease is of value and justifiable. These cases also teach the important lesson that rhinological examination may be negative and fail because of the difficulty in making the examination in very young children. It is also striking how very slightly the severe tuberculous affection at the apex of the orbit affects the rest of the orbital structures in contra-distinction to the severe inflammatory changes which take place in the orbit when there is acute ethmoid suppuration. The characteristic symptom is the very early participation of the optic nerve in the disease compared with the late and insignificant exophthalmos. The optic nerve is involved by direct extension from the sphenoid, the optic canal being first compressed and then destroyed by the granulation time. Another characteristic feature is the absence of any interference with the orbital muscles.

The ophthalmic signs, then, are—

- (1) Impairment of vision with subsequent optic atrophy.
- (2) Impairment and disappearance of light reflex.
- (3) Slight exophthalmos.
- (4) Absence of involvement of the other orbital structures.

Rhinological examination may be entirely negative, but tubercle elsewhere in the body may suggest the diagnosis.

R. BEATSON HIRD.

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III.—RELATIONSHIP BETWEEN DISEASED RETINAL AND DISEASED CEREBRAL VESSELS.

Geis, Franz.—On the relation of disease of retinal to disease of cerebral vessels. (*Die Beziehungen der Gefässerkrankungen der Netzhaut zu denen des Gehirns.*) *Klin. Monatsbl. f. Augenheilkunde*, Januar, 1911.

Geis enquires into the destiny of 250 patients who suffered from vascular disease of the retina, and arrives at interesting conclusions concerning the prognostic value of changes in the retinal vessels.

Ominous signs are pronounced sclerosis, and all conditions presumably due to sclerotic changes of the arteries: 17 patients above 40 years of age exhibited marked sclerosis of the vessels; they all died of cerebral apoplexy within four years. A similar fate awaited all patients who, without having ophthalmoscopically visible arterio-sclerosis, suffered from changes which, in the absence of any other likely cause, had to be attributed to arterio-sclerosis. Thus, of 17 patients with sudden blocking of the central artery or of one of its branches, not due to embolism, 14, certainly, and the other 3, possibly, died of cerebral apoplexy—as a rule, within two years. Cerebral hæmorrhage, not invariably fatal, supervened with the frequency of 100 per cent. in 50 cases of retinal and 6 cases of vitreous hæmorrhages, which were due to general arterio-sclerosis, chronic nephritis, or diabetes, and had the feature in common of increased blood pressure.

On the other hand, vascular changes not dependent upon sclerosed arteries are less or no evidence of a bad condition of the cerebral vessels, however unfavourable the vital prognosis may be for other reasons. Thus, retinitis albuminurica was the precursor of early death in 35 cases, but cerebral apoplexy occurred only in 9 of these patients. Three patients with retinitis albuminurica gravidarum recovered and remained well. About 40 per cent. of the cases of diabetic retinitis had a cerebral stroke, and this complication occurred with similar frequency among 52 patients with thrombosis of the central vein of the retina or one of its branches.

Nothing unfavourable to the condition of the cerebral vessels is to be inferred from the following changes: embolism or syphilitic disease of the retinal arteries, sclerosis of the choroidal vessels, subconjunctival or recurring vitreous hæmorrhages. Pre-retinal and isolated hæmorrhages in the macula lutea are followed comparatively seldom by cerebral apoplexy. C. MARKUS.

IV.—“SEE-SAW” PUPILS.

- (1) Miloslavich, E.—On see-saw pupils. (*Ueber springende Mydriasis.*) *Wiener klin. Rundschau*, No. 1, 1911.
- (2) Cramer, E.—See-saw pupils in a healthy girl seven years old. (*Springende Mydriasis bei einem gesunden sieben jährigen Mädchen.*) *Klin. Monatsbl. f. Augenheilkunde*, Februar, 1911.

(1) Miloslavich observed see-saw pupils in a case of neurasthenia or rather hysteria. The patient was a soldier, aged 20 years, who had suffered a severe

injury to his head when four years old. The tendon-reflexes were exaggerated, and there was loss of the cutaneous sensibility in nearly the whole trunk. Sometimes the right, sometimes the left, pupil was widely dilated, while the pupillary reflexes were not abolished. This alternate change in the size of the pupils occurred at varying intervals, sometimes twice in one day, sometimes after a lapse of two days. C. MARKUS.

(2) **Cramer's** case of see-saw pupils was that of a healthy schoolgirl, seven years of age. The changes in the size of the pupils were quite devoid of any regularity. The pupillary reflexes and accommodation showed no impairment. No cause whatever being discoverable for the phenomenon in this case, the question arises whether the condition may not be a purely functional change. C. MARKUS.

V.—AMAUROTIC FAMILY IDIOCY.

- (1) Carlyll, Hildred B., and Mott, F. W.—Seven cases of amaurotic idiocy (Tay-Sachs' disease). *Proceedings of the Royal Society of Medicine*, March, 1911.
- (2) Holmes, Gordon M.—The pathological anatomy of a case of amaurotic family idiocy. *Ibidem*.

(1) This important communication dealing with Tay-Sachs' disease is divided into two parts, the first (clinical) by H. B. Carlyll, and the second (pathological) by F. W. Mott, both of London.

Carlyll gives an historical summary of the development of our knowledge concerning the malady, and recounts at length the clinical history of seven cases, five of which were in girls and two in boys. All the children were of the Hebrew race. From the figures he gives it would appear that children suffering from amaurotic family idiocy are not likely to attain the age of three years. The retinal changes are not present at birth. Syphilis is not a factor in the disease. The disease is not restricted to the offspring of Polish Jews, as has been asserted, but may likewise affect German Jews.

Mott gives reasons for terming the disease "amaurotic dementia" rather than "amaurotic idiocy." Such are the normal size of the brain in these cases; the character of the convolitional pattern; the depth of the superficial grey matter; and, finally, the non-deficiency in the numbers of the cortical cells. Indeed, until the pathogenesis is definitely known, he thinks it preferable to adopt the name "Tay-Sachs' disease." The malady is an affection of the whole of the neurones of the body, the sympathetic ganglion cells being also involved, although not to the same extent as the cerebro-spinal ganglion cells. Mott has been unable to associate this peculiar disease with any condition of food or of environment. It is probably due to an inborn lack of specific vital energy of the nerve cells, due to a racial inherited failure of the germinal determinants of the nervous system. In other words, the nervous units are present at birth, but so deficient is their specific vital energy that they are unable to maintain physiological equilibrium, and to store any reserve of the Nissl substance (regarded by many as the material basis of nervous energy), and, in consequence, the conductile mechanism (neurofibrils) undergoes destruction, with morphological and bio-chemical changes in the neurones. As the last-named degenerate and die, the

neuroglial cells proliferate and increase in number, thereby communicating a tough and leathery consistence to the brain. Briefly, then, Tay-Sachs' disease probably represents a failure in the germinal determinants of the nervous system, peculiar to the Jewish race.

It is suggested that it may be due to a failure in the nuclear material of the neurones to build up the nucleo-protein Nissl substance out of lipid substances contained in the cytoplasm, which have first to be decomposed by a nuclear ferment. The auto-katalytic ferment action of the nuclear material of the fertilized ovum, described by Loeb, is considered by Mott as affording an example of a somewhat analogous chemical process.

In Tay-Sachs' disease there is a very remarkable disappearance of the Nissl granules proceeding towards the nucleus from without inwards, said to be present in no other human pathological condition. Neither has it been observed in any experimental conditions, such as ligature of blood vessels, hyperpyrexia, or toxic conditions in mammals. There is also a corresponding accumulation of a fatty substance in the nature of a lipid, so that the cell becomes swollen up, as if a process of hydrolysis had occurred. Moreover, there is destruction of the intra-cellular neurofibrillary network.

The morphological changes found are quite characteristic of the malady. All the ganglion cells stain with Scharlach, the intensity of the stain being proportional to the degree of swelling and obvious morphological change. The cells also stain with all methods capable of staining the myelin sheath or fat. The ganglion cells very rarely show *coarse* ruby-red globules of stained fatty substances, but there are, especially in advanced cases, immense numbers of cells containing these coarse globules. These are neuroglia cells which have taken up fat from decayed and dead ganglion cells. Mott surmises that they have the power of decomposing the lipid of the defunct ganglion cells and possibly of recomposing nuclear substance necessary for their proliferation from it. By other methods of staining (toluidin blue, Cajal silver, or Bielschowsky) it can be shown that the intracellular fibrils are ruptured and destroyed by the swelling, leaving only the peripheral neuro-fibrils, which can be followed from the dendrons to other dendrons or to the axon. In the cortex, the fibrils of the apical dendrons can be seen proceeding to the nucleus, which is usually forced up into the apex of the pyramid. In two of the three brains examined by Mott there was an accumulation of granulation cells along the course of the blood-vessels, and endothelial and connective tissue cells of the perivascular sheath could often be seen to be filled with the dark-red stained globules of fat.

By any of the methods employed for demonstrating neuroglia, it could be seen that there was an enormous overgrowth of fibrils, especially in the superficial layers, where it formed a dense feltwork both in the cerebrum and the cerebellum. The overgrowth was proportional to the duration of the disease.

The chemical analysis (carried out by Sydney A. Mann) of two of the brains of children who died from the disease failed to throw much light upon the question. The diminution of the lipid forms of phosphorus and sulphur found was probably due to the diminution of myelin, owing to the failure of development of the myelinated fibres. The corresponding increase of extractive forms of phosphorus and sulphur may be possibly due to a breaking down of the more complex into the simpler forms of lipoids.

Examination of the Retina.—When the retina was stained with Scharlach, the ganglion cells, which were of various sizes, showed a change similar to that found in the nerve cells of the central nervous system. In one of the cases portions of the retina were removed from one eye, preserved for a few days in 10 per cent. formol, floated into distilled water, and transferred to

an alcoholic solution of Scharlach R or Sudan III, in which they remained for some hours. They were then floated into weak alcohol (to wash away excess of stain) caught, ganglionic layer upwards, on a cover-glass and mounted in Farrant's solution. The ganglion cells, which seemed to be much more numerous in some places than others, varied considerably in size. Mott concludes that the difference in size is due to different-sized ganglion cells in the retina. They are depicted in Fig. 1. Fig. 2 shows the stratum opticum, with its ganglionic layer, inner molecular and inner granules, under a magnification of 450. The other eye of the same subject was hardened in 10 per cent. formol, embedded in cellodin, and sections through the entire

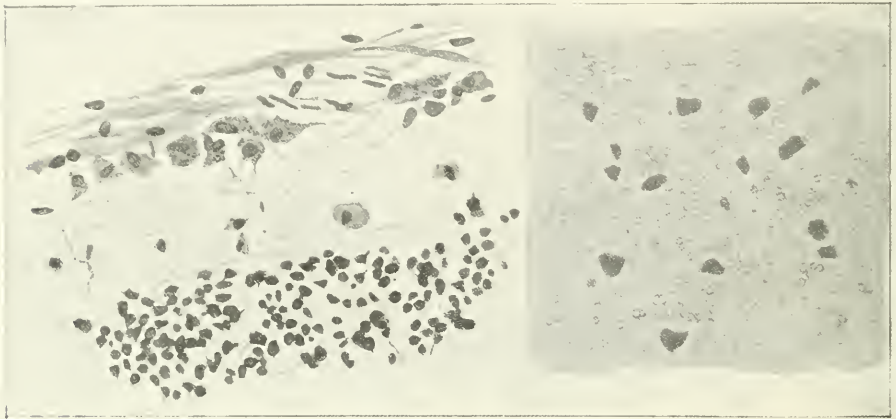


FIG. 1.

FIG. 2.

eye were cut and stained by polychrome blue, Nissl, Giemsa, and the van Gieson methods. The only changes observed were in the ganglion layer, the cells of which lay in confused clumps, appeared abnormal in shape, and no Nissl granules could be seen. The nuclei and nucleoli were well stained, but the cytoplasm was poorly so and appeared to consist of a fine intracellular network faintly encrusted with basophil substance. Here and there, ganglion cells with a swollen process could be seen.

SYDNEY STEPHENSON.

(2) A child, who showed symptoms of Tay-Sachs' disease, died at the age of 2 years 10 months from acute pneumonia. His sister, who died at the age of 1 year 8 months from chicken-pox, also suffered from amaurotic dementia. At the autopsy on the first-named child the brain, very hard and firm to the touch, was found to be abnormally large. Holmes, of London, now reports upon the pathological examination of certain small pieces of the cortex and subjacent white matter and of the cerebellum submitted to him for that purpose. The characteristic changes in the cerebral cortex were present, both in the nerve-cells and in the neuroglial matrix. Not a single cell of normal structure could be found. They were swollen, their angles had disappeared, and the usual number of dendrites could not be detected (material fixed in alcohol and ordinary tissue stains only employed). Club-shaped appendages to the basal margins of some of the larger cells could be seen. As regards the supporting tissue of the cortex, there was enormous increase of the neuroglial elements, both fibrillar and cellular. The neuroglial proliferation was almost as pronounced in the white as in the grey matter of the brain, and it was to it that the abnormal size and weight of the brain, as observed at the autopsy, are to be attributed. The walls of many of the larger cortical vessels

were thickened, and their sheaths were infiltrated by small lymphocytes. The cerebellum was atrophied. The Purkinje cells that persisted presented the same pathological changes as those of the cerebral cortex. The neuroglial sclerosis was less prominent than in the fore-brain.

SYDNEY STEPHENSON.

VI.—COLLOID EXCRESCENCES OF BRUCH'S MEMBRANE.

Coats, George.—An unusual case of colloid excrescences of the membrane of Bruch. *Trans. Ophth. Society U.K.*, Vol. XXXI, Fasc. i, 1911, p. 18.

An interesting account by **Coats**, of London, of the microscopical examination of an eye, the congener of which presented an ophthalmoscopic picture diagnosed as an "aberrant type of colloid degeneration of the membrane of Bruch." The eye was removed because it was painful, possessed merely perception of light, and had increased tension (1.5).

The eye was small in all its diameters, while the sclera and the choroid, especially as regards the anterior part, were thickened. The retina was detached. The corneo-iridic angle was free, and, so far as could be seen, there existed no hindrance whatever to the passage of fluids from the anterior chamber.

The choroid had undergone a peculiar form of degeneration. It included, broadly speaking, very few vessels, although the chorio-capillaris could be recognized almost everywhere. The thickening of the choroid, visible in the naked-eye preparations, was due to the presence of connective tissue, with elongated meshes, in which a small quantity of granular material was found. The appearance rather suggested hypertrophy and spacing-out of the lamina supra-choroidea. The lamina vitrea showed changes that ranged from the familiar "*Drusen*," on the one hand, to scales, flakes, or spongy masses of colloid substance, loosely attached to the inner surface of the choroid and enclosed by pigmented epithelium, on the other. The scales were usually connected with the membrane of Bruch by a few thin stalks, and their substance had an appearance similar to that of the membrane. A few nuclei were included.

The study of flat preparations left no doubt in Coats' mind that the ophthalmoscopic appearances in the other eye depended upon changes in Bruch's membrane similar to those found with the microscope in the eye that had been removed.

SYDNEY STEPHENSON.

VII.—MARGINAL ECTASIA OF THE CORNEA.*

- (1) **Gonzalez.**—Keratoglobus, consecutive to tertiary dystrophy of the corneal limbus. (*Queratoglobos consecutivo a una distrofia terciaria del limbo corneano.*) *Anales de Oftalmologia Hisp.-Amer.*, October, 1907.

*For references to this condition, see THE OPHTHALMOSCOPE, Vol. V, p. 260 and p. 660, Vol. VII, p. 872, and Vol. VIII, p. 39.

- (2) Adamantiadis.—A case of circumscribed ectasia of the cornea. (Un cas d'ectasie circonscrite de la cornée.) *Archives d'Ophthalmologie*, janvier, 1910.
- (3) Charles, J. W.—Ring ulcer of the cornea followed by an apparent incipient ectasis of the central portion. *American Journal of Ophthalmology*, May, 1910.
- (4) van Duyse.—Marginal degeneration of the corneæ. (Dégénérescence marginale des cornées.) *Bull. de la Société Belge d'Ophthalmologie*, No. 29, p. 138, 1910.
- (5) Fisher, J. Herbert.—A case of marginal keratectasia - bilateral. *Trans. Ophthal. Society U.K.*, Vol. XXX, Fasc. 1, p. 25, 1910.
- (6) Zentmayer, Wm.—Marginal degeneration of the cornea. *Annals of Ophthalmology*, January, 1911.
- (7) Coats, George.—Pathological examination of the specimen from a case of marginal keratectasia previously shown by Mr. J. Herbert Fisher. *Trans. Ophthal. Society U.K.*, Vol. XXXI, Fasc. 1, p. 5, 1911.
- (8) Markus, C.—A case of peripheral and central bulging of the cornea - bilateral. *Ibidem*, Vol. XXXI, Fasc. 1, p. 1, 1911.

(1) Gonzalez's patient, who had suffered from undoubted syphilis ten years before, had recently had many tertiary ulcerations in various parts of the body. He came to Gonzalez on account of an affection of the right eye. The cornea was infiltrated round the whole margin, and the central region, although it remained transparent, was yielding to the intra-ocular pressure, and a keratoglobus resulted. The refraction of the eye was highly myopic: it was corrected by -10.0 D. sph. c. -2.0 D. cyl. axis horizontal. There was no reason to think that the eye had previously been ametropic. The left eye showed keratitis, in the shape of numerous small transparent ulcers, surrounding the corneal limbus.

In face of the clear specific history, Gonzalez suspected that the lesions might have a specific origin, and he treated them by anti-syphilitic measures. The result justified his anticipations: the eye soon recovered almost the normal curvature.

HAROLD GRIMSDALE.

(2) Adamantiadis, of Broassa, Turkey-in-Asia, records the occurrence of this condition in a woman of 38, who for five years had noted gradual diminution of vision in the right eye. The cornea presented a whitish crescent, 1 mm. by 7 mm., situated in the supero-internal quadrant at the periphery. Between the crescent and the limbus was a band, 1 mm. broad at its extremities to 1.5 mm. at its central part, of clear and smooth cornea in a condition of ectasia. The cornea, as a whole, appeared to be stretched out towards its upper and inner part, as though dragged by the ectatic portion. The neighbouring bulbar conjunctiva was slightly hyperæmic, and some vascularisation was present at the limbus sending a few small terminations to the middle of the ectasia. The iris showed a small notch at a point opposite the middle of the band. The rest of the eye was normal, but it squinted internally. There was a mixed astigmatism present of 15 D., on correction of which the vision was $1/8$. Several cauterisations reduced the astigmatism to one of -9 D., with corrected vision $=1/5$. A review of the cases published since 1896 is given.

The author thinks that the condition is due to a degenerative process analogous to arcus senilis, and that it is best to call it "sclerosis" or "peripheral

atrophy of the cornea." It may occur, he considers, in two clinical forms differing slightly from each other, namely, "circumscribed ectasia of the cornea" or "gutter formation of the cornea." Both are found at the superior periphery of the cornea and both are accompanied by an opacity of crescentic shape, recalling arcus senilis, and by a thinning of the cornea. The difference lies in the production of an "ectasia" or a "gutter." The two forms are rarely met with in the same eye.

BERNARD CRIDLAND.

(3) In the case reported by Charles, of St. Louis, the patient, a female, aged 49 years, was first seen in January, 1901, suffering from ring ulcer involving the nasal portion of the *right* cornea. (Diagram given.) V.A. = 15/150. The progress of the ulcer was checked by treatment, and the patient disappeared. In January, 1905, the patient returned with a ring infiltration on the nasal quadrant of the *left* cornea. This progressed until it occupied two-fifths of the corneal periphery. Four days after admission, there was an ulcer. Smears and cultures from it were negative at first but some days later showed *staph. pyog. alb.* in pure culture. At this time R.V. with cylinder + .75 vert. = 15/15. L.V. with cylinder + .75 vert. = 15/38. Treatment of the left cornea resulted in healing. In April, 1909, the patient again put in an appearance, on account of phlyctenulæ in both eyes. The interesting point now emerges.—The refraction had altered since last note, namely:—

R. —2D. cyl. axis 175° = 19/15

L. —2.5D. cyl. axis 180° = 19/15

The right corneal periphery was still slightly opaque and depressed, while the pupillary area was prominent, as if a glass bead had been deeply imbedded in the corneal tissue. No lens changes were noticed.

The author seems to conclude from this case and from another case of ectatic clear cornea (not keratoconus) in the practice of John Green, that a degeneration at the limbus, causing a weakening of the resistance of the cornea to the normal tension, may result in such central ectasia.

ERNEST THOMSON.

(4) van Duyse, of Ghent, deals with the typical disease attributed by Seefelder to fatty and hyaline degeneration of the corneal lamellæ. Histological investigations have led us to abandon the idea of a chronic inflammation, such as is implied by the names *chronische periphere Fürchenkeratitis* (Schmidt-Rimpler) and *keratitis marginalis superficialis* (Fuchs). The marginal attenuation (a fact accepted by everybody) allows us to understand two symptoms of the disease which may occur singly or in combination, (1) the trench or gutter-like depression, and (2) the ectasia of the corneal margin. By Seefelder and Handmann it is believed that the condition is rare, but with this opinion the author does not altogether agree.

van Duyse's case was as follows:—

The patient, aged 70 years, has been known to the author for 25 years. In 1885, a glittering trench was observed in the right cornea. Between that year and 1900, an iridectomy was performed on account of multiple posterior synechiae. In 1905, cataract and ectatic ophthalmic deformity of the eye. A portion of the cornea is delimited by a white line, marking the attenuated peripheral parts of the membrane. The transparent vitreous vesicles (2 mm. to 2.5 mm.), which were present in 1907, have disappeared. At their situation are seen rounded or oval *plaques*, limited by an epithelial border, showing here and there keratoses of a glistening white appearance. No staining by fluorescein. Conjunctival vessels traverse from above downwards the thinned sector of the cornea. At the lower part of the cornea is a transparent trench, separated from the central parts of the cornea by a greyish-white stripe, and situated at a distance of 1 mm. from the opaque margin of the cornea. The left eye showed a fairly typical condition. It became affected in 1905—that is to say, twenty years after the other one. The mischief commenced by a furrow at the upper edge of the cornea, in the situation of a gerontoxon. In 1908, iridectomy was performed on account of *seclusio pupillæ*. The furrow is now transformed into a semilunar sector, attenuated and transparent, limited below by a slightly raised white stripe. Three prominent vitreous productions, formerly present on the nasal side, have been replaced by *plaques* of thinned cornea.

SYDNEY STEPHENSON.

(5) In a female, aged 41 years, **Fisher**, of London, describes a distortion of each cornea, due to great stretching of the upper marginal segment, and limited below by a well-marked line, of greyish-white colour. The distended segment formed almost an angle with the more normal parts of the cornea. R.V. = 6/60 and No. 12 Jaeger. L.V. (corrected) = 6 6 fairly and No. 1 Jaeger.

A crescent of the extremely thin tissue which formed the upper part of the cornea was removed surgically, and an account of the pathological examination of this fragment is published (7) by **Coats**, of London. The greater part of the specimen was made up of a loose, somewhat cedematous, vascular connective tissue, lying beneath the epithelium, and resembling the ocular conjunctiva in appearance. The other outstanding changes were—numerous ruptures in, and enormous thickening of, Descemet's membrane (due to successive deposits of new material), scantiness of the corneal stroma, and absence of Bowman's membrane. The cells of the anterior epithelium in one considerable area were cedematous, separated from one another by a granular coagulum, and showed a few leucocytes in the deeper layers.

Coats takes this case as a text for some illuminating remarks upon the whole subject of marginal keratectasia, a condition probably always preceded by so-called "furrow keratitis" (Schmidt-Rimpler) or "marginal atrophy of the cornea" (Fuchs). The affection is usually bilateral, and occurs in middle-aged or old persons. The initial groove (from which there is no loss of epithelium) develops in the upper periphery of the cornea, and is associated, as a rule, with a well-marked arcus senilis. In the course of years it may extend around the cornea completely. It is seldom accompanied either by pain or inflammation. But even its early stages may be marked by a decrease in sight, due to distortion of the cornea and the consequent development of astigmatism "against the rule." Eventually, the groove may be replaced by a protrusion, with much astigmatism as its result. The ectasia retains its transparency, and its lower edge is delimited by white or yellow spots, which probably represent the remains of the arcus senilis originally present. In addition, a second crescentic opacity may be present above, in which event the two crescents coalesce at the lateral boundaries of the protrusion and are usually continued into the arcus at the lower part of the cornea. An eye in this condition may be ruptured by very slight violence (Seefelder).

Among atypical points may be mentioned the occasional appearance of the disease in comparatively young persons; absence of the arcus senilis; transposition of the groove and the arcus; development of the ectasia below instead of above; and the association with ulcer of the cornea or trachoma. By Coats the last two points are regarded as coincidental.

Coats discusses the two rival views as to pathogenesis, *viz.*, the degenerative and the inflammatory, and points out that the two theories are perhaps not so irreconcilable as might at first sight appear. A very chronic inflammation may give rise to degeneration, or, as suggested by Fuchs, the neighbouring tissues, stimulated by the products of degeneration, may undergo a low form of inflammation, not necessarily so severe as to arouse the attention of the patient. The evidence is against the view that the ectasia is due to stretching of the scleral segment of the corneo-scleral margin. SYDNEY STEPHENSON.

(6) **Zentmayer**, of Philadelphia, reports a case of marginal degeneration of each cornea in a woman of 48 years, who manifested no other signs of "pre-senility." There was a well-marked groove encircling each cornea except for an arc of about 15° down and in. It was situated on the peripheral aspect of the arcus senilis. It did not stain with fluorescein. Small areas of

hyaline degeneration were present. The ocular conjunctiva showed several points of adhesion to the groove, especially above. Refraction: 5 D. of hyperopia.

SYDNEY STEPHENSON.

(8) This interesting case by **Markus**, of London, shows that practically the entire cornea may become involved in keratectasia. A female, aged 46 years, complained that her sight had become slowly worse during the last two years. V. = fingers at 4 metres. The right cornea, with the exception of a marginal zone about 1 mm. in width, was greatly stretched, the point of greatest prominence lying a little below the centre of the cornea. The distended area was encircled by a white line. An early ectasia was present in the marginal zone about the upper end of the vertical meridian. Similar appearances were present as regards the left cornea, although the condition did not bear so much likeness to keratoconus as in the right eye.

SYDNEY STEPHENSON.

VIII.—NYSTAGMUS.

- (1) **Coppez, H.**—Studies on the morphology of nystagmus. (*Etudes sur la morphologie du nystagmus.*) *Académie de Médecine de Belgique*, 25 juin, 1910.
- (2) **Rutten.**—A new theory of the pathogeny of miners' nystagmus. (*Nouvelle théorie sur la pathogénie du nystagmus des houilleurs.*) *Société Belge d'Ophtalmologie*, mai, 1910.
- (3) **Dransart and Famechon.**—On miners' nystagmus in the coal-bearing districts of the north of France during the years 1908 and 1909. (*Sur le nystagmus des mineurs dans le bassin houiller du Nord de la France pendant les années 1908 et 1909.*) *Bull. de la Société Belge d'Ophtalmologie*, No. 29, 1910, p. 147.
- (4) **Weekers.**—Researches upon retinal adaptation among miners in professional nystagmus. (*Recherches sur l'adaptation rétinienne chez les houilleurs dans le nystagmus professionnel.*) *Ibidem*, p. 210.

(1) **Coppez**, of Brussels, has studied by the aid of Buys' "Nystagmograph" (see *THE OPHTHALMOSCOPE*, 1909, p. 808) nystagmus of visual origin due to ocular affections, whether congenital or acquired in early infancy. The most diverse forms of ocular oscillations may be encountered in each of these varieties of nystagmus.

MARCEL DANIS.

(2) According to **Rutten**, of Liège, nystagmus can be provoked neither by accommodative nor retinal fatigue. The cause of the nystagmus must be sought in the compass-like movement of the eye provoked by the inclined position of the body. When the general position of the body differs from the ordinary attitude, a reflex act is produced: a compensatory movement of eye (*gegenrollung* of the Germans).

MARCEL DANIS.

(3) **Dransart and Famechon** distinguish a severe from a slight form of nystagmus. The first-named renders work painful or even impossible for a period that ranges from two weeks to seven or eight months.

1. *Number.*—From a population of 40,000 miners, the authors have had under treatment 211 cases of nystagmus. The proportion of severe nystagmus is about 3 per mille of the total population.

2. *Variations*.—The distribution of severe cases varies with the Company, with the year, the minimum being 1·13 per mille and the maximum 6·65 per mille. There is reason for supposing that in the lie of the coal-bearing strata, their nature and their distribution, will be found the factors influencing the frequency of nystagmus.

3. *Monthly Variations*.—The greatest number of cases is to be found in the months of December, January, February, and March.

4. *Influence of age*.—The condition increases from 15 to 35 years, and diminishes from 35 to 60 years. The maximum incidence is between 30 and 45 years.

5. *Influence of occupation*.—Of the cases, 209 were workers in the seam, and two were inspectors, formerly colliers.

6. *Influence of refraction*.—Nothing special, except a couple of instances of high myopia.

7. *Influence of general state and of injuries*.—In 39 cases (19 per cent.) injury of the eye; in 32 cases (16 per cent.) some general affection, as influenza, pneumonia, or rheumatism.

8. *Influence of fatigue*.—(a) Nystagmus is more pronounced when coming up from than when going down into the mine; (b) nystagmus is more frequent among the workmen in slightly elevated seams or among the miners who hew hard coal; (c) movements of the body augment nystagmus; (d) convalescents, the weakly, and alcoholics, are more readily affected. MARCEL DANIS.

(4) Even now there exists no satisfactory pathogenic theory to explain professional nystagmus. For some time **Weekers**, of Liège, has directed his attention to the study of a characteristic symptom which is found with remarkable constancy in miners' nystagmus, namely, a disturbance in the adaptation to darkness, of a certain degree of hemeralopia. The patients volunteer the statement that when they reach the bottom of the pit, they do not see during the first few minutes; they perceive only the oscillations of the lamps of fellow miners, without being able to distinguish either the men who carry them or the surrounding objects. At the end of about ten minutes, however, they see well enough to find their way to their place of work. An analogous difficulty overpowers them when they come up. They are dazzled by the light, and obliged to shield their eyes with their hand; seized with a kind of vertigo, they are compelled to take hold of something, in order not to stagger. Again, at the end of a few moments, these disturbances pass away, and nystagmus makes its appearance. This retardation in adaptation for different lights, and the consequent disturbance, is found especially in the more serious cases of nystagmus, but may also be present in the milder cases, although to a less degree.

Side by side with these disturbances of adaptation, there are others, also of a constant nature, which appear to be connected with an anomaly of accommodation, and which equally merit attentive examination. It would be interesting to make among miners and those affected with nystagmus a systematic study of the function of accommodation. This study has been commenced by Weekers, and although his investigations are still only at the commencement, he has discovered several novel points.

In his researches Weekers has employed a modern appliance, Nagel's "Adaptometer," by which one can determine rigorously the feeblest luminous intensity that can be perceived, and record that intensity in figures. Since this determination may be made from minute to minute, the order in which adaptation marches may be followed. Moreover, the figures thus obtained may be set out as a graph, and in that way very demonstrative curves may be obtained.

The examinee's eyes must be well adapted to light. The experiment, then, should be made towards mid-day on a sunny day, and before beginning the experiment, the subject should be asked to walk for at least an hour regarding the sky in the meanwhile. He is then placed in a dark room, and the minimum of luminous intensity perceived by the "Adaptometer" is determined, say, every five minutes. The experiment extends over an hour.

When a normal person is examined in this way we find that adaptation can scarcely be said to exist for the first ten minutes, so that in graphs the curve of adaptation coincides with the abscissæ. After the first ten minutes the curve rises progressively and regularly during forty or fifty minutes, to attain then a level which it maintains. From this moment the curve remains level. The level attained by the curve of adaptation is sensibly the same for individuals whose eyes are normal. On the contrary, in certain ocular maladies, especially in those which are accompanied by an alteration in the retinal pigment, the curve of adaptation suffers profound changes.

Miners not affected with nystagmus have, in general, an excellent adaptation, which is often, indeed, superior to the normal, a fact in which perhaps we see the result of being accustomed to darkness. Nocturnal animals have better perception at night than have diurnal animals, although it is true that the reason is to be found in the special structure of the retina.

The results obtained in cases of miners' nystagmus are variable. In certain cases the curve of adaption is entirely normal: it rises after the normal period to attain the same level as in healthy persons. That is particularly the case in nystagmics who experience no subjective disturbance or very little, sometimes even to the extent of being ignorant of the affection of their eyes. At other times, on the contrary, the curve of adaptation is altered, and the changes may be arranged under these circumstances in two groups: in the first category, the degree of adaptation is normal, but the adaptation comes about with a certain delay. The curve does not begin to rise until after the lapse of about twenty minutes. In the second group, adaptation is entirely defective, inasmuch as the line rises only after a notable delay, and attains a lower level.

These alterations of adaptation are found in cases of grave nystagmus, in patients who present considerable subjective disturbance, and who by reason of the ocular trouble, are unable to work in the mine.

It is worthy of remark that there is not always a parallelism between the intensity of the nystagmic oscillations, on the one hand, and the disturbance of adaptation, on the other. On the contrary, it appears that this parallelism exists between the disturbance of the adaptation and the subjective discomfort complained of by the patient. Thus, it is in men who complain the most of being inconvenienced in their work by the ocular affection that we find the alteration in adaptation the most marked, and not always in those where the nystagmus is most pronounced. This observation should place us on guard against the error of regarding as simulators men with moderate nystagmus who appear to be distinguished by excessive complaints.

It will be apparent, then, these researches in adaptation among those suffering from nystagmus allow one of the symptoms of nystagmus to be analysed—heimeralopia. Further, the determination of adaptation in nystagmus is a rigorous criterion for recognizing the incapacity to work at the pit bottom, an incapacity which it is useful to expose, since it renders the men dangerous both to themselves and to others.

MARCEL DANIS.

IX.—REMEDIES.

- (1) Wibo.—The employment of Hata in the treatment of affections of the eye. (L'emploi du Hata dans le traitement des affections oculaires.) *XIV^e Congrès flamand des Sciences Naturelles et Médicales*, 1910.
- (2) Weekers.—Antipneumococcal serotherapy in ocular affections. (Sérothérapie antipneumococcique dans les affections oculaires.) *Le Scalpel*, 29 mai, 1910.
- (3) van Lint.—Argyrol in ocular therapeutics. (L'argyrol en thérapeutique oculaire.) *La Polyclinique*, 15 juin, 1910.
- (4) Zirm.—Alcohol and ointment dressing in eye bandages. (Alkohol und Salbenfleckverband am Auge.) *Wochenschrift f. Therapie u. Hygiene d. Auges*, Januar 5, 1911.
- (5) Zirm, E.—On dionin and other resorptive methods for the eye. (Ueber Dionin und andere Resorptionsmittel am Auge.) *Wochenschrift f. Therapie u. Hygiene d. Auges*, Juli 17, 1910.
- (6) Daxenberger, F.—Mastix as a closure for the eye. (Mastixverband am Auge.) *Wochenschrift f. Therapie u. Hygiene d. Auges*, Juli 28, 1910.
- (7) Darier, A.—The treatment and the prophylaxis of purulent ophthalmia. Superiority of the organic salts of silver. *La Clinique Ophtalmologique*, 10 septembre, 1910.
- (8) Cassimatis, C.—On the employment of silver nitrate in ocular therapeutics. *La Clinique Ophtalmologique*, 10 septembre, 1910.
- (9) Van Lint.—Argyrol in ocular therapeutics. *La Clinique Ophtalmologique*, 10 septembre, 1910.
- (10) Wibo.—The employment of Hata "606" in some eye affections of specific origin. (L'emploi du Hata "606" dans quelques affections oculaires d'origine spécifique.) *Bull. de la Société Belge d'Ophtalmologie*, No. 29, 1910, p. 223.
- (11) Bérard. —Aristol in affections of the eyelids, conjunctiva, and cornea. (L'Aristol dans les affections des paupières, de la conjonctive, et de la cornée.) *Rev. Int. d'Hygiène et de Thér. Oculaires*, octobre, 1910.
- (12) Fromaget.—On the uselessness of mercurial treatment in heredo-syphilitic keratitis. (Inutilité du traitement mercuriel dans la kératite hérédo-syphilitique.) *Ann. d'Oculistique*, octobre, 1910.
- (13) Colin, A.—The frequency of intoxication by atropine in ophthalmic children. (Fréquence de l'intoxication par l'atropine chez les enfants ophtalmiques.) *La Clinique Ophtalmologique*, 10 décembre, 1910.
- (14) Wolffberg.—Dionin in hæmorrhagic glaucoma. (Dionin bei Glaucoma hæmorrhagicum.) *Wochenschrift f. Therapie u. Hygiene d. Auges*, Januar 5, 1911.
- (15) Darier, A.—"606" and recent progress in syphilotherapy. *La Clinique Ophtalmologique*, 10 février, 1911.

- (16) Stuelp.—Results to date from literature and personal experience of Salvarsan in ocular syphilis. (Bisherige Erfahrungen mit Salvarsan bei Augensyphilis aus der Literatur und an eigenen Fällen.) *Wochenschrift für Therapie und Hygiene des Auges*, 23 Februar, 1911.
- (17) Zirm, E.—Scopomorphin (Scopolamine-morphine) half-narcosis in ophthalmology. (Zur Anwendung der Scopomorphin-Halbnarkose in der Augenheilkunde.) *Wochenschrift für Therapie und Hygiene des Auges*, 23 Februar, 1911.
- (18) Ryerson, G. Sterling.—On the use of radium in eye diseases. *Canada Lancet*, March, 1911.
- (19) Fromaget and Mongour. — Tuberculous keratitis cured by Marmorek's serum. *La Clinique Ophthalmologique*, 10 mars, 1911.
- (20) Bourgeois, A.—Chaufrage of infective ulcers of the cornea. (Le chaufrage des ulcères infectieux de la cornée.) *Annales d'Oculistique*, avril, 1911.
- (21) Flemming.—The action of "606" upon the eye. *Arch. f. Augenheilk.*, Bd. LXVIII, 1911, and *Archives of Ophthalmology*, May, 1911.
- (22) Schnaudigel, Otto.—Ehrlich-Hata "606" in ophthalmology. *Ibidem*.

(1) Wibo, of Brussels, has tried "606" with good results in ocular palsies of syphilitic origin, and in heredo-syphilis. A slight improvement was produced in some long-standing affections of the retina and optic nerve.

MARCEL DANIS.

(2) A *résumé* of the results obtained by Roemer and Axenfeld by the employment of anti-pneumococcic serum.

MARCEL DANIS.

(3) According to van Lint, of Brussels, argyrol is the best remedy for all external infections of the eye. He employs a 10 per cent. solution, prepared with cold water. Indications. acute conjunctivitis due to the Koch-Weeks' bacillus or to streptococcus, acute recrudescences of inflammation in trachoma: subacute conjunctivitis, phlyctenular conjunctivitis, blennorrhagic conjunctivitis (at the same time as silver nitrate), corneal ulcers, and progressive ulcerations of the cornea (at the same time as other local remedies). van Lint advises the prophylactic use of argyrol in measles, with a view to preventing ocular complications.

MARCEL DANIS

(4) To produce hyperæmia of the eyelids and conjunctiva, Zirm, of Olmütz, places a layer of wool or gauze wrung out of rectified spirit against the closed eye. It is covered by a layer of dry wool and then by guttapercha tissue. The dressing is repeated three-hourly. This procedure is used for septic ulcers, iritis, cyclitis, and septic wounds and similar conditions of the lids. It is said to be soothing and effective in reducing pain. During dressing the author dusts aïrol on ulcers, and applies sublimate ointment before reapplying the alcohol bandage.

For phlyctenular ulceration a layer of gauze coated with any ointment desired is applied next to the eyelids and followed by wool and bandage. When excessive discharge is present, these bandages are best omitted.

W. B. INGLIS POLLOCK.

(5) Zirm, of Olmütz, finds dionin useful for a large category of eye-conditions. In combination with atropine, it aids the latter greatly in corneal and iritic inflammations. For phlyctenular ulcers of the cornea it is best combined with yellow ointment. In septic wounds and operations, subconjunctival injections of saline together with dionin in powder form are

advised. Subcutaneous injections of fibrolysin, accompanied by dionin and moist heat locally, the author has found useful in opacities of the cornea. The subconjunctival injections may contain alypin, acoin, or novocain, when used as above with dionin. For hæmorrhages in the retina the author recommends a 2-3 per cent. solution of dionin in drop form. W. B. INGLIS POLLOCK.

(6) Mastix in a chloroform solution (20:50) to which linseed oil has been added was introduced by W. V. Oettingen for the treatment of wounds. Without the use of soap or antiseptics, the margins of the wound are sprinkled with the mastix solution, a pad of sterilised wool and gauze is then applied and becomes immediately fixed, so that bandages are unnecessary. The method is said to have been extensively used by the Russians in the war. **Daxenberger** has employed mastix after eye operations and wounds to fix the margins of the sterilised pad of wool or gauze, which is best applied in layers to prevent the solution running into the eye. It apparently resembles a collodium dressing. The author states the pad can be kept moist by dropping solutions, *e.g.*, boracic, saline, on the pad, as the mastix is only applied at the margin. With children or alcoholics a bandage may be necessary. W. B. INGLIS POLLOCK.

(7) This article, by **Darier**, of Paris, is one in which the advantages of the organic salts of silver, and more particularly of argyrol, are still further pressed home. In addition to the well-known advantages of argyrol as a therapeutic agent, Darier here scores the point that it has been used in 500 cases as a prophylactic without a single infection. The strength employed was 10 per cent. to 15 per cent. In using argyrol as a prophylactic, it is important that the edges of the eyelids should be well impregnated with the solution, for it is almost always here that one finds the infective elements at the moment of birth. ERNEST THOMSON.

(8) **Cassimatis**, of Alexandria, has found in his Egyptian experience that nitrate of silver is a more trustworthy application for purulent conjunctivitis than the newer organic salts. Further, he uses the nitrate in solutions from 5 per cent. to 7 per cent., with the precaution, however, that the cornea is not touched by such solution, and the further precaution that the solution is duly neutralized with sodium chloride. The cases in which this treatment is more especially indicated are those in which the disease has arrived at a stage intermediate between the acute and the chronic, in which stage there is persistent purulent secretion, without much tendency to corneal involvement. It is to be borne in mind that children bear the application of strong nitrate well, and that the old often stand it badly. One must therefore proceed cautiously and ascertain the patient's tolerance. Since the conjunctiva very soon becomes tolerant of any given strength, it is necessary to increase the strength or the frequency of application so long as the disease remains resistant, reducing the severity of the treatment as the purulence subsides. ERNEST THOMSON.

(9) **van Lint**, of Brussels, has been very favourably impressed with the results of the employment of argyrol, within the limits of his use of it. He has never found that it causes appreciable improvement in various cases of dacryocystitis and blepharitis, and he is unable to give any personal statistics of it when used as a prophylactic of ophthalmia neonatorum. The real indications for this drug, in his opinion, are acute or subacute conjunctivitis, phlyctenular or pustular conjunctivitis, and corneal ulcers accompanied by conjunctivitis. The strength employed is 10 per cent. van Lint sums up in the following words:—"Argyrol is an excellent medicament. In the form of instillations it rapidly cures all the external infections of the eye. In connection with the ocular complications of measles the action of argyrol as a

prophylactic ought to be given a trial." This writer says, also, that with argyrol there is little fear of argyrosis of the conjunctiva ; that it must be used continuously for at least six months before argyrosis will appear.

ERNEST THOMSON.

(10) **Wibo**, of Brussels, has treated some fifteen cases of tertiary syphilitic eye disease by injections of "606." In most instances the Wassermann reaction was positive. The diseases treated fell into three groups : 1. lesions of the motor apparatus of the eye ; 2. lesions of the external membranes of the eye ; and 3. lesions of the deeper membranes, including the optic nerve. Two cases of interstitial keratitis (both recurrences) yielded with surprising rapidity to the remedy, and the same remark is also true of a couple of patients suffering from paralysis of the extra-ocular muscles. As regards the third group of cases, namely, those with affections of the fundus oculi, Wibo reserves details for a future communication, and here merely states that encouraging results were obtained.* One patient in whom the injection, although made into the buttock, evidently passed directly into a vein, was seized with fits of coughing, and complained of lively pain behind the sternum, and sensations of oppression, prostration, and malaise.

In the discussion that followed the reading of Wibo's communication, **Weekers**, of Liège, related two cases, one of gummatous iritis, and the other of interstitial keratitis, where despite the failure of mercurials, the injection of "606" led to a happy result. **Terlinck**, of Brussels, related details of seven cases of specific eye diseases (seen in the *clinique* of Professor Bayet) all cured by the administration of "606."

SYDNEY STEPHENSON.

(11) **Bérard**, of Angoulême, is convinced that in the treatment of blepharitis, conjunctivitis, and phlyctenular keratitis aristol has advantages over the yellow oxide of mercury. The remedy is used as an ointment, applied to the eyes night and morning. It is non-irritating. It may be applied locally at the same time as a preparation of iodine is given internally. The aristol, which is employed, as a rule, as a 1 per cent. ointment, undergoes alterations when exposed to light.

SYDNEY STEPHENSON.

(12) **Fromaget**, of Bordeaux, urges the uselessness of mercurial treatment in interstitial keratitis. He records four cases in which the disease developed while the patient was under the influence of mercury, and refers to eighty-seven cases from his own practice treated with arsenic, iodotannic syrup, and cod-liver oil, in which the results were at least as good and the duration of the disease at least as short as could have been expected even under intensive mercurialisation.

R. J. COULTER.

(13) **Colin**, of Nice, has made the interesting observation that a considerable number of children, when treated by instillation of aqueous solution of atropine, present some signs of slight atropine poisoning. "After the instillation of one or several drops of an atropine collyrium, in a time varying from one to twenty minutes, the child's face becomes red and congested ; not always, but frequently, this redness extends to the chest and abdomen. The child, as a general rule, continues to amuse itself as if nothing were the matter, and its behaviour seems in no way influenced by these intoxication phenomena. The pulse, the temperature, and the respiratory rate remain normal. I have never seen true prostration or delirium, which are so often seen in adults. After a lapse of time, varying from one to three hours, the phenomena gradually disappear, the child regains its normal colour, and no symptom remains of

*In a postscript to his communication, Wibo states that he has now had an opportunity of studying the action of "606" in several cases of eye disease due to secondary syphilis, as iritis, cyclitis, irido-cyclitis, neuritis, and chorio-retinitis. The good results obtained he attributes to the large doses of the medicament administered.

this intoxication." The remedy, according to Colin, is use of the oily solution or an ointment. Where a watery solution is employed, the finger is placed for a time over the lacrymal puncta.

ERNEST THOMSON.

(14) **Wolffberg's** patient, a woman of 57 years of age, with hæmorrhagic glaucoma, tension +2, and vision reduced to the recognition of a candle flame at the outer side, refused operation. Eserin in $\frac{1}{2}$ per cent. solution and aspirin internally, failed to relieve until aided by the application of dionin in powder form. After a night's sleep, the cornea and the media cleared, the vision improved to counting fingers at two metres, and the ophthalmoscopic examination revealed numerous irregular hæmorrhages in the retina. Vision ultimately rose to 0.3.

W. B. INGLIS POLLOCK.

(15) **Darier's** article is of the nature of a review of the present position of the treatment of syphilis.

(16) **Stuelp** arranges his paper on "Salvarsan" in ocular syphilis under three heads, and it is convenient to give a *résumé* in a similar manner :

1.—*Results of Salvarsan treatment in eye syphilis*, and indications to be drawn from 421 cases.

	Cases.	Rapid or good results. Percentage.	No result or relapse. Percentage.
Syphilitic disease of eyelid	3	100	—
" " conjunctiva... ..	8	63	37
" " cornea	95	27	73
" " sclerotic	5	80	20
" " uveal tract	85	63	37
" " retina, optic nerve... ..	76	63	37
" " eye muscles	132	33	67
" " orbit and trigem. nerve	7	103	—
In 421 ocular syphilitic affections	—	66	34
General syphilitic affections (Plaut)	—	77	23

Very unfavourable results have been reported in parenchymatous keratitis, and tabetic optic nerve atrophy and ocular muscular paralysis by certain authors, while others were exceedingly optimistic. The above table seems also to indicate that ocular affections respond less satisfactorily than other syphilitic diseases to "salvarsan."

Recrudescence two or three months after an injection of salvarsan in the early stage of syphilis when all the other secondaries had disappeared was shown by the appearance of iritis 13 cases, choroiditis 3 cases, optic neuritis 14 cases, and ocular muscle paralysis 8 cases. Several of Stuelp's own cases, *viz.*, an iritis, a keratitis, and a retino-choroiditis, showed no improvement or relapsed after a temporary improvement.

Oculists are therefore advised to use "salvarsan" injections (1) when a *rapid* effect is desired (primary disease or rapid loss of function); (2) in cases where mercury or iodide is not borne or is without effect. In all other cases reliance should be placed on the older proved methods.

2.—*What complications may be expected?* Local complications are infiltrations and necrosis; thrombosis and embolism after intravenous injections; ocular flickerings and swimming before the eyes, scintillating scotoma, transitory amaurosis, ptosis, and glaucomatous increase of pressure; and general complications are fever, vomiting, diarrhœa, polyuria, anuria, tenesmus of bladder or rectum, albuminuria, or hæmorrhagic nephritis, diabetes, icterus, etc. It has not been decided yet whether these should be regarded as toxic results or due to over-sensitiveness of the individual.

Death has rapidly followed the injection in 42 cases ; but it may have been due to accidental complications.

Persistent sequelæ have not been observed.

3.—*What contra-indications have so far been recognised?* A most careful examination should precede an injection of salvarsan, so that none of the following contra-indications may be overlooked :

1. Optic nerve or retinal diseases of a non-syphilitic nature.
2. Neuroses or organic disease of the heart or vascular system.
3. Severe pulmonary affections.
4. Severe nephritis or diabetes of non-specific origin.
5. Severe visceral lues or ulceration of the stomach.
6. Advanced degeneration of the nervous system or alcoholism.
7. Severe congenital syphilis in the new-born.
8. The specific fevers or high fever.
9. Menstruation.
10. Degeneration, marasmus, or cachexia, non-specific senile.

W. B. INGLIS POLLOCK.

(17) **Zirm**, of Olmütz, has employed scopomorphin in over 120 operative cases during the last two years. He regards it as a valuable adjunct to local anæsthesia for excitable or anxious patients, especially with irritable eyes. The disadvantages of a general anæsthetic in ophthalmic surgery are well-known, and this method avoids the anæsthetic apparatus, the unconscious upward rotation of the eyeball, and the after-sickness. The patient lies half anæsthetised ("twilight sleep"), appears to react slightly, rarely gives expression to pain, does not squeeze, and "after the operation he falls into a quiet sleep, awaking several hours later, and often his first question will be, 'When is the operation?'"

Complications are unknown, and vomiting is rare. Early in his experience, 2 ccm. were given to a child of 7 years, who required artificial respiration for half an hour, owing to asphyxia.

The combined method is found most useful for iridectomies in glaucoma, or traumatic cases either early or late, for cyclodialysis, paracentesis, complicated cataract operations, enucleation, evisceration, and epithelioma of the eyelid. If general anæsthesia is required, less anæsthetic is employed and the patient remains quieter.

Children under fifteen years of age, or old and wasted patients, should not have this procedure. Cardiac disease is a contra-indication.

The method of procedure is as follows.—On the previous evening veronal, grm. 1, is given. The scopomorphin (Riedel's) grm. 1.5 to 2 for men and grm. 1 for women and old patients, is divided into two doses ; and the first is injected about two hours before the operation, and the other half an hour before the operation. The patients are kept resting in a slightly darkened room. Although the results are not uniform, Zirm states that the procedure is always of advantage.

W. B. INGLIS POLLOCK.

(18) This brief communication by **Ryerson**, of Toronto, satisfactorily epitomises the uses of radium in external diseases of the eye. In his opinion, the rays should always be "filtered" through lead, tin, or aluminum, except in epithelioma. He suggests that the emanations might be of service in lental and vitreous opacities. "True carcinoma is still outside the possibilities of cure, while sarcoma, if superficially situated and of recent growth, will rapidly melt away."

SYDNEY STEPHENSON.

(19) **Fromaget** and **Mongour**, of Bordeaux, relate the case of a boy of 15 years in whom an interstitial keratitis was associated with a tuberculous lung condition. The authors are satisfied that the keratitis was tuberculous in nature. The eye disease was quite limited to the cornea. Fromaget wished to treat the

condition by tuberculin, but consulted Mongour, who did not advise it. On the advice of the latter, treatment was carried out by hypodermic injections of Marmorek's serum. Five injections, each of five cubic centimetres, were given at intervals of eight days. After only three weeks of treatment, the cornea, which had been almost totally infiltrated, was almost perfectly normal.

ERNEST THOMSON.

(20) During the last eleven years **Bourgeois**, of Reims, has treated upwards of two hundred ulcers of the cornea by means of hot air, as described by him in the *Annales d'Oculistique* for 1899. The appliance used by dentists for drying cavities in teeth by means of a current of hot and dry air is utilized by Bourgeois for carrying out his method. After the *chauffage*, he applies iodoform, airol, or xeroform to the ulcer, and closes the eye with a dressing, which should be renewed, as a rule, every day. The results are stated to leave nothing to be desired. Micro-organisms are destroyed by the hot air, and any hypopyon that may be present is quickly resorbed. At the same time the author employs, in addition to the *chauffage*, if necessary, instillations of atropine, and treats the lacrymal passages, if diseased, by irrigation, *curtage*, or destruction of the lacrymal sac. Bourgeois applies the same method in superficial infected wounds of the eye. In threatened panophthalmitis, on the contrary, he adopts subconjunctival injections of mercury cyanide.

SYDNEY STEPHENSON.

(21) **Flemming**, of Berlin, bases his report upon 180 cases of syphilis of the eye treated with "606" in Greeff's *klinik*. Most of the patients were treated by subcutaneous injection with the alkaline solution, which is sterile, readily prepared, and is said never to be followed by undesirable results. The intravenous plan was adopted in a few instances: but the neutral suspension and the acid solution were sedulously avoided by Flemming. All cases were subjected to the Wassermann test. The dose of arseno-benzol varied for adults from 0.3 to 0.7 gramme, while in children 0.08 gramme was administered for every kilogramme of the body weight. Symptoms of arsenical poisoning were never seen. Neither were the brilliant results observed by some others noted in Flemming's cases. With but few exceptions, the results of treatment by "606" were not more pronounced than those obtained by the more familiar anti-syphilitic remedies. Arseno-benzol appeared to have the power of assuaging subjective symptoms, without, however, influencing the physical conditions to anything like the same extent. But the rule is not constant. In cases of interstitial keratitis and sympathetic ophthalmitis the effects of the new treatment were not striking, but in iritis and specific "hyalitis" they were more encouraging. In a case of choked disc, the optic papilla had become normal two weeks after the injection of "606." Syphilitic endarteritis became worse after injection, and the results in paralysis of the extrinsic muscles of the eye, although good at first, were not permanent. Negative results were obtained in instances of optic atrophy and of pupillary disturbance. The ill-effects attributed by some writers to "606" are put down by Flemming not to the remedy but to syphilis. Thus, in seven cases inequality of the pupils was observed soon after administration of arseno-benzol. The conclusion drawn is that anisocoria is a secondary symptom of the syphilitic infection, and that its early appearance after the treatment is to be accounted for by a local reaction induced in diseased structures by the remedy. The same line of argument applies to facial paresis, optic neuritis, ophthalmoplegia, and other untoward symptoms reported after the use of "606."

Flemming sums up the matter by saying that in "606" we have an effectual treatment for syphilitic diseases of the eyes where a rapid result is

essential, or where the condition has failed to respond to treatment by mercurials or iodine. It is not a panacea in eye disease capable of supplanting our present remedies. SYDNEY STEPHENSON.

(22) This report by Schnaudigel, of Frankfort, deals with the treatment of twenty-one cases of syphilitic disease of the eye by the intra-gluteal injection of the neutral emulsion of "606." The only exception to this statement was in a patient where the remedy was injected beneath the skin between the shoulder blades. No serious complications. The cases treated included iritis, kerato-iritis, optic neuritis, papillo-retinitis, tarsitis, ataxic paresis of superior oblique muscle, tabes dorsalis with pupillary disturbances, optic atrophy, and interstitial keratitis. The Wassermann reaction was apparently tried in all but two of the cases, and it yielded a positive result in all with the single exception of a man suffering from kerato-iritis of four weeks' duration (Case No. 2.) With one exception, where the treatment failed entirely, arseno-benzol succeeded admirably. Noteworthy was a syphilitic tarsitis of several months' duration, where an injection of 0.5 gramme of Ehrlich-Hata was followed by cure in six days. In another striking case (No. 3) a vascular swelling of the iris in acute iritis, yielded within six days of the injection. Schnaudigel concludes that "we probably have in arseno-benzol a most important addition to ophthalmic therapeutics." SYDNEY STEPHENSON.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

THE SMITH OPERATION FOR CATARACT.

To the Editor of THE OPHTHALMOSCOPE.

SIR,

In your issue for April, p. 232, fig. 1, Dr. Derrick T. Vail describes the "Jullundur" type of speculum. The instrument illustrated is no other than that which I advocated on p. 13 of my work on *The Methods of Operating for Cataract, etc.*, published in 1894, and a modified form of which was made for me by my instrument makers (*vide* p. 14-15) as given in my work.

The following are the advantages of these very simple forms of speculum: (i) Easy application to any eye, whether deep or shallow in the orbit, or with wide or narrowed palpebral fissures. (ii) Easy adjustment to the inner or outer canthus of the eye. It is a distinct gain in the operation described by Vail for the speculum to be applied at the inner canthus, since it avoids the surgeon's fingers touching the spring, and prevents any chance of the knife's blade or handle coming into contact with it while operating—a very necessary thing to avoid accidents or blunting of the knife's edge.

As regards fig. 6, p. 234, Vail tells us that Smith prefers knives marked "dangerous" by the makers. After re-setting, I am told, they are more liable to fracture through being thinner in the blade, and hence are marked "dangerous."

To promote early primary adhesion and rapid union of the edges of the wound, it is necessary to have a clean and not a jagged incision. I have described this clearly on p. 17 of the book above referred to. The incision in such an operation is a series of rapid horizontal cuts from the temporal to the nasal side. The knife's fine edge follows the curvilinear line of the cornea, the corneo-sclerotic junction, closely, inclining a little forward at each stroke.

while the back of the blade inclines away from the iris. This can be easily accomplished by practice with a normal length of blade; but not with a short one. A further advantage of such a blade, is the minimum of disturbance of the eyeball in its socket, otherwise it means a see-saw motion by the to and fro incision which is jagged, and there is therefore loss of perfect co-aptation of the edges of the wound, preventing early primary union.

The principle to observe in the particular incision I have described is a horizontal position of the blade from start to finish after transfixion, when, it will be found, that the line of incision is hardly discernible by the naked eye, so perfect is the co-aptation of the edges. A short knife is a distinct loss to the surgeon, for there is a series of short and sharp strokes, instead of the free and long ones which complete the incision rapidly.

Yours truly,

185A, BROMPTON ROAD,
LONDON, S.W.
2nd May, 1911.

G. W. FINK,
MAJOR I.M.S., M.R.C.S. (ENG.)
L.S.A. (LOND.)

BOOK NOTICES.

The Medical Annual. 1911. Twenty-ninth Year. Bristol: John Wright and Sons, Ltd. 814 pages, many illustrations. Price 8/6 net.

The *Medical Annual* is really so well-known that an extended notice of the volume for 1911 is hardly necessary.

As most of our readers are aware, the general plan of the book is alphabetical. This means that one cannot easily ascertain what is the latest work on, say, eye diseases in general, but must look up the book under the names of the diseases. While, no doubt, this plan is the best for the reader, it makes the task of the reviewer more difficult than if the diseases were grouped. We shall excuse ourselves from saying anything about diseases other than those of the eye, beyond the statement that merely to turn over the pages makes one feel superlatively ignorant.

Under *General Therapeutics of the Eye* we find radium treatment, ionization, carbon dioxide snow, and the danger of the arylarsenates. Under *Eye Injuries* the giant magnets are referred to. The article on *Ocular Tuberculosis* includes Harrison Butler's plates of the fundus, originally published in THE OPHTHALMOSCOPE. There is a judiciously written article on *Glaucoma*. The discussion which has taken place on the ætiology of *Iritis* is noticed. Nimmo Walker's views on *Ophthalmia Neonatorum* appear under the heading "*Labour*." "Nimmo," however, appears as "Munro." In the paragraph on *Optic Neuritis* the question of "ipsilaterality" is discussed, and some of Sir Victor Horsley's plates are reproduced. Under *Cataract* the principal question discussed is, of course, that of intracapsular extraction. *Conjunctival Diseases* are, as usual, principally represented by infantile ophthalmia and by trachoma, but notice is taken of Marlow's case of *Ophthalmia Nodosa*, of Collins's case of *Nodular Leprosy*, and of Lawford's case of *Episcleral Tubercle*, all of which abstracts are illustrated. Under *Retinal Detachment* the Reviews of Ernest Thomson and Casey Wood are grouped together.

From the point of view of completeness it would not be fair to compare *The Medical Annual*, covering the whole ground of medical and surgical treatment, with *The Annuals* which are devoted to special subjects, but all the same we consider that the special subjects selected for notice are well chosen and well dealt with.

For the general practitioner, more especially, the *Annual* must be invaluable. One cannot help wondering how it can be produced at the money.

ERNEST THOMSON.

The Refraction of the Eye, a Manual for Students. By GUSTAVUS HARTRIDGE. 15th Edition. London: J. and A. Churchill. 1911.

"Fifteen editions with a total issue of 33,000 copies"—such is the legend on the back of the title page, and it is one to make the reader look again to see if he has not perchance picked up a popular novel. Such a sale far outstrips the usual vogue of a medical text-book, and it is one on which the author is to be congratulated. The reasons are obvious enough: the book is concise, clear, abundantly illustrated with diagrams, and yet is sufficiently advanced to enable the student to deal with most cases of ametropia met with in practice.

While on the clinical side, the experience of Mr. Hartridge gives to all he writes the *cachet* of authority, on the more purely optical, or scientific, part there are some defects which, one is surprised to find, have run the gauntlet of so many re-issues.

Thus, the metrical angle (p. 43) is regarded as being only half what it really is. According to the diagram, it is subtended by the intersection of the visual axis of one eye with the sagittal line, *i.e.*, the normal to the centre of the inter-pupillary distance. In the letterpress (p. 46) we are told that "when the centres of rotation are 6·4 cm. apart, then the metre angle equals 1° 50'." When Nagel introduced his unit in 1880, he defined it as "the deviation which one eye undergoes when it fixes a point one metre distance on the visual line of the other eye." Thus, if p be the base line, d the distance of the fixation point, and θ the angle subtended by the intersection, we have

$$\frac{p}{d} = \tan \theta \text{ or } \frac{64}{1000} = 0\cdot064$$

which is the tangent of 3° 40', *i.e.*, twice 1° 50'. Ought not the student also be told that it is a variable unit dependent on the interocular distance? If this be 5·8 cm. the M.A. is only 3° 20'.

Another curious point is to be found in the chapter on refraction, p. 22. "These together (the media) make up the dioptric system, and may for the sake of simplicity be looked upon as the equal of a convex lens of about 23 mm. focus." The "equivalent lens" of the human eye is the inverse of the anterior focal length, not of the posterior focus. To express it optically,

$$D = \frac{1}{F_l}, \text{ or } \frac{1000}{15} = 66\cdot\bar{6} \text{ D.}$$

A glass lens of 23 mm. focus has a power of 43·5 D. which is the power of the cornea only.

Under the "causes of hypermetropia" (p. 124). We find "a diminution in the index of refraction of the aqueous . . . or vitreous."

Now if the index of the crystalline lens in air be μ_1 , and of the other media μ_2 , the relative index of the immersed lens will be $\mu_1 \div \mu_2$.

Taking the absolute index of the lens as 1.42, of aqueous and vitreous 1.33, the relative index of the lens is 1.067. Reducing the index of aqueous and vitreous to, say, 1.30, the relative index of the lens becomes 1.09. In other words, the reduction of aqueous and vitreous index raises the power of the lens and shortens its focal length, hence causing "index myopia"—not hypermetropia. When dealing with convergence we find a looseness of expression which has previously been pointed out, in this very connection. "The angle of convergence is at infinity, $C = \infty$; and the refraction is also at infinity, $A = \infty$." Surely it ought to be

$$C = D \text{ and } A = O.$$

In justice to Mr. Hartridge, one must say that he is by no means alone in these errors, which are perpetuated by practically every writer, especially by Landolt in his large work on refraction.

Minor points are the absence of information regarding the valuable rotating prisms of Herschell and of Maddox, toric lenses, the pocket spherometer, the angle *kappa* (the only one we really measure), the regulations as to sight in the Mercantile Marine (probably those one most needs to refer to), and the question whether Donders' presbyopic equivalents are not too high.

The book is very free from misprints, of which only two have been noticed—"Herring" (p. 226) should be Hering, of course, and "Maddock's" (index) Maddox.

The above points are so treated as to enable the author to consider them in the light of the next and of the many other editions this useful work is destined to undergo; for beyond their indication, one can have nothing but praise for the qualities of the book.

WILLIAM ETTLES.

NOTES AND ECHOES.

Deaths.

A VERITABLE Nestor of Ophthalmology, Dr. Hermann Knapp, of New York, died on May 1st at Mamaroneck in his eightieth year. We shall publish some notes of our distinguished colleague's career in a forthcoming number of THE OPHTHALMOSCOPE, and in the meantime we beg to tender the deep sympathy of all British ophthalmic surgeons to the deceased's son, Dr. Arnold Knapp, and to his daughters, Mrs. G. H. Cocks and Mrs. S. Kammerer. R.I.P.

John Tatham Thompson died at his residence in Windsor Place, Cardiff, on Friday, April 28th, after a long and painful illness. He was born in York in 1857 and educated at the Bortham School in that city, of which his father was the senior master. After leaving school, he studied natural science in London and at Bristol University College where he acted as demonstrator of physics to his brother, Professor Silvanus P. Thompson. He joined the Medical School of Edinburgh University in 1880, and after taking the degrees of M.B., C.M., in 1885, worked under the late Dr. Argyll Robertson until 1887. He was then appointed ophthalmic surgeon to the Cardiff Infirmary, a post which he held until his compulsory retirement at the end of 20 years' service, when he was appointed Consulting Ophthalmic Surgeon to the institution. Thompson also held the appointments of Surgeon Oculist to the South Wales Institute for the Blind and Medical Referee for the South Wales District

under the Workmen's Compensation Act. At the time of his death he was Chairman of the Cardiff Division of the British Medical Association and of the Medical Board of the Cardiff Infirmary, and he had been a Vice-President of the Ophthalmological Society of the United Kingdom, and President of the South Wales and Monmouthshire Branch of the British Medical Association, the Cardiff Medical Society, and the Cardiff Naturalists' Society.



The late Mr. JOHN TATHAM THOMPSON.

His contributions to ophthalmological literature included papers on "Operations for Staphyloma Corneæ," "Emphysema of the Conjunctiva," "Förster's Artificial Maturation of Cataract," and "Miner's Nystagmus in the South Wales Collieries," as well as a pamphlet on "The Influence of Early School Life on the Development of Myopia."

Thompson was an excellent artist, and during his college days, his caricatures of the Edinburgh Professors were well known, while many of the illustrations in Professor Sims Woodhead's "Practical Pathology" were from his drawings. He also illustrated Berry's text-book of ophthalmology.

Outside his professional life, he was a man of many activities. He was a keen golfer and in later years took up the game of bowls with his customary zeal. He held high rank among the Freemasons, being a Founder and Past Master of the Prince Llewelyn Lodge 2570 at Cardiff, and a member of the Glamorgan Lodge No. 36. Last year he was Worshipful Master of the Langley Lodge of Mark Master Masons. He held high office in the Knight

Templars, and Rose Croix Masons and was an officer of the Provincial Grand Lodge of the Eastern Division of South Wales and the Treasurer of the Provincial Grand Lodge of Mark Master Masons and a Past Principal of the Royal Arch Chapter of St. John. He was very popular at social gatherings of all sorts, and his after-dinner speeches and recitations were always in great demand.

Thompson was an enthusiastic volunteer, holding the rank of Major in the R.A.M.C. Territorials, and last November received the Territorial Decoration from His Majesty. His death leaves a wide gap in social and professional circles, which it will be difficult to fill. He was given the honour of a military funeral, and the large number of representatives of public bodies who attended officially, together with the crowds which lined the streets of Cardiff, testified to the high esteem in which he was held by all classes. His body was cremated at Golder's Green.

As baldly announced in our last issue, Dr. Charles A. Oliver died at his home in Locust Street, Philadelphia, on April 8th, after an illness of a fortnight's duration.

Oliver was born at Cincinnati, Ohio, in the year 1854. In his early childhood his parents removed to Philadelphia, and he lived the remaining fifty-four years of his life in the "Quaker City." He passed through the various Philadelphia schools, and graduated from the Medical Department



The late Dr. CHARLES A. OLIVER.

of the University of Philadelphia in 1876. After serving a term as *interne* at Philadelphia General Hospital, he practised general medicine for some years. He then became associated with the late Dr. William F. Norris, in the service of the latter at the Wills Eye Hospital, and in 1880 he was made one of the surgeons to that institution. He was also one of the ophthalmic surgeons to the Philadelphia General Hospital, St. Mary's Hospital, St. Agnes Hospital, and the Presbyterian Hospital, most of which connections he kept

up until his untimely demise. Oliver was connected with many medical and scientific societies in America and elsewhere. The number has been stated as 56 of the former and 33 of the latter. His contributions to ophthalmic literature were numerous, chief among them being *A Text-Book on Ophthalmology*, of which Dr. William F. Norris was the senior author. He was also co-editor with Dr. Norris of *A System of Ophthalmology*, in four volumes, a standard work that at once conferred high rank upon its editors. Oliver acted as co-editor of THE OPHTHALMOSCOPE from shortly after its foundation in 1903 until the end of 1908, and during that period several communications from his pen appeared in its columns. Oliver was an enthusiastic and thorough-going ophthalmologist. He excelled in plastic work. His books were left to the University of Harvard, the University Club of Philadelphia, and all pictures, etc., to Lafayette College, Easton, Pa. His estate, which amounted to 15,000 dollars, was divided into three parts, one for the use of Wills Eye Hospital, another for the foundation of a Prize in Ophthalmology, and the third to the College of Physicians of Philadelphia for the purchase of journals of ophthalmology.

American ophthalmic surgery has sustained a great loss by the death, at the age of 76 years, of Dr. Charles Stedman Bull, of New York. He died on April 17th last from valvular disease of the heart. Born in New York, Bull graduated from the College of Physicians in the year 1868, and he then spent several years in study on the continent of Europe. Returning to America, he commenced the practice of ophthalmology in St. Louis, but he soon moved to New York, where he achieved an international reputation. He was a member of the American Medical Association, the New York Academy of Medicine, and the New York Ophthalmological Society. From 1903 to 1907 Bull was President of the American Ophthalmological Society. He had been attached to the Manhattan Eye and Ear Hospital (1871-1873), and the New York Eye and Ear Infirmary (1871-1911). For the last twelve years or so Bull had been professor of ophthalmology in the medical department of Cornell University. His contributions to the literature of his specialty were both numerous and important.

Another prominent American ophthalmic surgeon, Dr. Leartus Connor, of Detroit, Michigan, passed away suddenly on April 16th last at the age of 68 years. The cause of death was cerebral hæmorrhage. Dr. Connor was an ex-president of the American Academy of Ophthalmology and Otolaryngology, and ophthalmic surgeon to Harper Hospital and to the Children's Hospital, Detroit. For several years he had endeavoured to induce general practitioners of medicine to undertake the treatment of simple cases of refraction, and by his persistent and strenuous advocacy of this measure had succeeded in getting more than one State Medical Board to include refraction in its examination for qualification. He had also obtained an endorsement of his policy from several medical societies, ophthalmological and otherwise.

Dr. Henry Gradle succumbed to carcinoma of the bladder on April 4th at Santa Barbara, California, where he was wintering. He was of German birth. He had formerly been professor of ophthalmology and otology in the North-Western University Medical School at Chicago. Gradle was a member of various learned societies, including among their number the American Medical Association, the Heidelberg Ophthalmological Society, and the Chicago Ophthalmological Society, in the last-named of which he had occupied the office of president. Death occurred in his fifty-fifth year.

The deaths are also announced of the following American ophthalmic surgeons:—Arnett P. Boston, of Alice, Tex., Ledyard V. Lewis, of Sun Prairie, Wis., William E. Hibbard, of Pasadena, Cal., and Albert R. Baker, of Cleveland, Ohio.

The death is announced in his seventy-eighth year of Wilhelm Manz, who was born, lived, worked, and died at Freiburg i. Br. In 1861 Manz was appointed extraordinary professor, and seven years later, ordinary professor of ophthalmology and director of the *Augenklinik* of that city. He retired in the year 1901. His chief work perhaps dealt with the development and malformations of the human eye, but he also wrote on other subjects, particularly on tubercle of the choroid. Manz was, moreover, the originator of the lymph stasis theory of the production of choked disc.

With regret we announce the death on April 11th last of Oskar Königshöfer, of Stuttgart, at the early age of 59 years. He was professor of veterinary ophthalmology in Stuttgart, where he founded and directed for the long term of twenty-eight years the *Charlotten-Heilanstalt für Augenkranke*. This eminent ophthalmic surgeon edited for many years *Die Ophthalmologischen Klinik*, now unfortunately defunct. Königshöfer took a very prominent part in adjusting the relationships between medical practitioners and working-class clubs, for several years a burning question in most parts of Germany.

The death is announced of Dr. W. N. Gagarin, the well-known ophthalmic surgeon of St. Petersburg.

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Appointments. GEORGE COATS has been appointed assistant ophthalmic surgeon to St. Mary's Hospital, London.

Philip A. Harry has been appointed ophthalmic surgeon to the Rochdale Infirmary, Lancashire.

William Appleyard has been appointed assistant surgeon to the Bradford Royal Eye and Ear Hospital.

J. Bowring Horgan has been appointed oculist, rhinologist, and laryngologist to the North Charitable Infirmary, Cork.

Adolph Bronner has been appointed honorary consulting laryngologist to the Bradford Royal Infirmary. At the same time the best thanks of the Board of Management were accorded to him for his services as honorary laryngologist since the year 1891.

Bernard Cridland has been appointed medical referee for ophthalmic cases for County Court Circuit No. 25.

E. W. H. Shenton has been appointed medical officer to the Electro-Therapy Department, Royal London Ophthalmic Hospital (Moorfields).

G. T. Mould has been appointed assistant in the refraction department for school children at the Royal London Ophthalmic Hospital (Moorfields).

Dr. Wendell Reber has been appointed visiting ophthalmologist to the Philadelphia General Hospital.

Dr. W. M. Sweet has been elected surgeon to the Wills Eye Hospital, Philadelphia.

Dr. Cantonnet has been appointed ophthalmologist to the Paris hospitals.

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Benefaction. BY the will of Mr. Henry Hill, the Worcester Ophthalmic Hospital receives £3,000.

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An Ontario Optometry Bill. THE *Canada Lancet* has the following outspoken note dealing with the now defunct Ontario Optometry Bill:

THE OPTOMETRY BILL.

For some time past the people of Ontario have been made familiar with an attempt on the part of certain persons who wish to fit people with spectacles to become incorporated under the high-sounding title of optometrists.

To select glasses for one is not even a full branch of medicine. It is only a subsection of the every-day work of an oculist. Some medical men make a specialty of diseases of the eye, and selecting suitable lenses for their patients is part of this specialty.

It would be just as sensible to incorporate certain persons as dermatologists or skin disease doctors. To treat skin diseases is only a subsection of general medicine. We might even look to the incorporation of naval doctors who would treat the diseases of the umbilicus.

There is no limit to where this folly may lead us. Some persons who will not take a course of study and qualify for the practice of medicine or surgery wish to secure incorporation to enable them, on a minimum of training, to practise some small subsection of the healing art.

Thus we could in time have nail doctors, and hair doctors, and spectacle doctors, and umbilicus doctors, all by act of parliament, made out of any persons and every sort of persons who wish to make a living out of the public, and do not wish to go through a proper course of preparation.

Let us have an end of this creation of osteopaths, optometrists, etc., etc. Legislators owe it to their constituents to protect them from this farce.

The optometry bill was killed. Hon. I. B. Lucas gave it as his opinion that it would create a close corporation. There is a decided feeling against this sort of legislation.

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The Florida State Optometry Board. THE following paragraph, published by the *Optical Journal and Review* (New York) of April 6th, 1911, is really too refreshing to be missed by readers of THE OPHTHALMOSCOPE.

"A class of 10 applicants for State certificates to practise optometry in Florida presented themselves for examination at the meeting of the Board, held at Ocala, March 16th. Number seven did not have its lucky charm in this instance, as only three succeeded in making the required percentage of 75.

The Florida Board take the position that the law was passed to improve optometry, and they are "standing pat" regardless of influences brought to bear to pass applicants who do not prove themselves up to the standard. The standard will continue to be raised rather than lowered.

One applicant appeared who had had some experience vending spectacles, mostly planos and $+12\frac{1}{2}$. The secretary of the Board tried to persuade him not to take the examination if he valued the examination fee of \$10. The secretary advised him to invest the money in books rather than with the Board. The applicant would not be persuaded, so he was provided with the first sheet of 20 questions. After he looked over the questions, he requested an oral examination, which was refused. Then he withdrew and the Board refunded his fee of \$10.

Later in the day the applicant appeared and insisted that he was sufficiently qualified to 'peddle spectacles,' as he had built up a business and earned the reputation of 'nigger eye doctor.' He said to the secretary: 'I know a whole lot about the profession, but you get up new things and I don't know nothing about them.'

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Royal Society of
Edinburgh.

MAJOR G. E. GIDNEY, I.M.S., has been elected a Fellow of the Royal Society of Edinburgh.

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A New Society.

THE Philadelphia Polyclinic Ophthalmic Society has just been organised with the following officers: President, Dr. Wendell Reber; Secretary, Dr. Joseph McCool; Executive Committee, Dr. Wm. Campbell Posey, Dr. Wm. Sweet and Dr. Wm. Zentmayer.

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Central London
Ophthalmic Hospital.

THE Duchess of Albany has consented to lay the foundation stone of the new building of the Central London Ophthalmic Hospital, in Judd Street, St. Pancras, in July.

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